Demographic Survey Research in Irian Jaya

Population Dynamics in the Teminabuan Area of the Bird's Head Peninsula of Irian Jaya, Indonesia

Hendrika Lautenbach

NETHURD Publications

Stellingen behorend bij het proefschrift

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This book has been published in the PDOD publication series A (doctoral dissertations). This series has been established through co-operation between THELA THESIS and the Netherlands Graduate School of Research in Demography (PDOD).

The Netherlands Graduate School of Research in Demography (PDOD) was established in 1989, as a joint initiative of the University of Amsterdam (UvA, Secretariat), the University of Groningen (RUG), the University of Utrecht (UU), the Catholic University Brabant (KUB), and the Foundation Netherlands Interdisciplinary Demographic Institute (NIDI). It aimed at training researchers in efficiently gaining insight into demographic processes as such, and into the interdependencies between different demographic processes and the environment (context) in which these processes are taking place. The school combined half a year of curricular PhD courses with three and a half years of dissertation research supervision.

From January 1996, the PhD course activities of PDOD have been incorporated in the course activities of the Research School NETHUR, under the name of Nethur-Demography. NETHUR, the Netherlands Graduate School of Housing and Urban Research, is a collaborate undertaking of four Dutch universities: the University of Amsterdam (UvA), Delft University of Technology (TUD), Eindhoven University of Technology (TUE), and Utrecht University (UU, Secretariat). NETHUR is accredited by the Royal Netherlands Academy of Arts and Sciences (KNAW). Disciplines represented in NETHUR are: architecture, planning, law, demography, economic geography, urban geography, urban sociology and geo-information technology.

From the same date, responsibility for the PDOD's dissertation research supervision activities has been transferred to local faculty research institutes: the Amsterdam Study Centre for the Metropolitan Environment (AME) in Amsterdam and the Institute of Spatial Research (IRO) in Utrecht, both participating in NETHUR; the Population Research Centre in Groningen, participating in the research school Systems, Organization and Management (SOM); and the Work and Organization Research Centre (WORC) at the Catholic University of Brabant, Tilburg.

ISBN 90-5538-040-7
NUGI 671 / 659

Rijks*universiteit* Groningen

Demographic Survey Research in Irian Jaya

Population Dynamics in the Teminabuan Area of the Bird's Head Peninsula of Irian Jaya, Indonesia

Proefschrift

ter verkrijging van het doctoraat in de
Ruimtelijke Wetenschappen
aan de Rijksuniversiteit Groningen
op gezag van de
Rector Magnificus, dr. D.F.J. Bosscher,
in het openbaar te verdedigen op
maandag 6 december 1999
om 14.15 uur

door

Hendrika Lautenbach

geboren op 15 april 1965

te Bolsward

Promotor: Prof.dr.ir. F.J. Willekens
Referenten: dr. J. Miedema
dr. L.E. Visser

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Preface

Extensive swamps, sago as the main staple food, and endemic malaria are the main aspects which emerge when literature on Teminabuan, or rather literature on the coastal areas of Irian Jaya is consulted (literature on Teminabuan hardly exists). At first sight, none of these aspects seem attractive when one considers a research site for a demographic survey. Still, for me it was an appealing idea to spend one year in such an environment. First, the project provided a great opportunity to conduct survey research in a very different setting from my previous work which mainly concerned the evaluation of the health status and health facilities in developing countries. Second, it offered the opportunity to explore an area that had not been researched by demographers previously. Third, the research provided the chance to experience the life of Papuans.

Such an experience becomes more valuable when you can share it. The company of my husband Dominique Ducornez during the time spent in Indonesia is therefore very precious to me. We often recall events which occurred during that year. Furthermore, the data gathering could not have been completed within the available time without his assistance.

This demographic research is embedded in a multidisciplinary research programme entitled 'Irian Jaya Studies, a programme for Interdisciplinary Research' (ISIR), which is a priority programme of the Netherlands Organization for Scientific Research (NWO). The ISIR programme is financed by The Netherlands Foundation for the Advancement of Tropical Research (WOTRO). The Indonesian counterpart of the ISIR project is the *Lembaga Ilmu Pengatahuan Indonesia* (*LIPI*), the Indonesian Institute of Sciences. I like to thank the people of *LIPI* and prof. M. Rumbiak from the *Universitas Cendrawasih* in Jayapura, who acted as the counterpart for this demographic research. They facilitated my field work in Irian Jaya. As many organizations were involved, it meant that many people played either a direct or indirect role in the realization of this project. The initiators of the ISIR programme, prof. Wim Stokhof and dr. Jelle Miedema, deserve my gratitude for carrying out the enormous task of initiating the programme. Once the programme started, Wim Stokhof acted as director of the programme and Jelle Miedema as co-ordinator.

In The Netherlands, my work was supervised by four people, who all made valuable contributions to my work especially because of their different disciplines. Prof. J.D. Speckmann was always calm and good humoured with me and this made confident that I could complete the task satisfactorily. His advice based on long experience made the method of sample selection suddenly very obvious and clear. Sadly, Speckmann died at the end of 1997.

Dr. Jelle Miedema, co-ordinator of the ISIR programme and also supervisor of a number of doctoral students, emphasized the anthropological approach of the research. His focus on the micro-perspective, that is the village level, did not always correspond to my more subdistrict level of analysis. However, his ideas usually made me reflect on the material and this resulted in interesting information being added to my work. Furthermore, he was very thorough in proofreading draft chapters of this book.

The critical remarks of dr. Leontine Visser also helped me to reconsider what I had been writing. Her extensive knowledge on literature regarding various topics related to my project, proved valuable. As we spent a week together in Teminabuan, I cherish the memory of singing psalms around the dinner table at the Mambor's, where the dogs always joined us in the singing.

Special thanks go to my supervisor prof. Frans Willekens, to whom I am very grateful for guidance in my research. His stimulating comments on my work helped a lot in the preparation of the survey and in the task of writing up the results. I very much appreciated his professional approach to research, which has always been accompanied by a good sense of humour. From the very start, he has always supported me in my work and his confidence in me has greatly encouraged me.

Greet Bakker taught us Bahasa Indonesia on a weekly basis in a very friendly atmosphere. Though it first looked as if we had forgotten all our Bahasa Indonesia once we arrived in Indonesia, after some time her lessons proved their merit.

By her friendship and analytical approach of the questions put to her, I experienced much support from Sietske Waslander.

At this point I want to express my gratitude and admiration for the work carried out by the survey assistants Paulina Selaya, Dorsila Krimadi, Maria Sesa, Rosina Sabru, and Rode Momot. I will always remember their patience in explaining local customs and beliefs, their dedication to master the skills required to complete the questionnaires, and their eagerness to travel with me to all the villages. Deborah Bushiarah, co-ordinator of the *P3W* (the local women's training centre) also needs to be mentioned. Not only did she help to select and motivate these women to become survey assistants, she also accompanied me to all the 31 villages of Teminabuan subdistrict. In this way, I became familiar with every village. On the basis of this I could decided which villages to include in the survey. In her company, learning about the villages was easier than it would have been without her. Also, during the first few months of my stay in Teminabuan, I still had great difficulty in expressing myself in Bahasa Indonesia. During this time, Deborah was always willing to bring my message across if I failed to find the words myself.

Bapak camat Otto Ihalauw together with his colleagues supported this research by providing me with the necessary documents. He called on all *bapak-bapak desa* to cooperate and make the necessary arrangements such as provision of lodging and food. He also made sure that the villagers were staying in the village at the time of the survey. In addition, Otto Ihalauw discussed research matters which enriched my study.

The health workers in the *puskesmas* of Teminabuan were kind enough to offer information on family planning and the causes and numbers of deaths (in the *puskesmas*) over the last twelve months.

Lydia Mambor-Bähler and Wim Mambor cordially received us in their house when we arrived in Teminabuan. Their '*rumah andeh*' has offered all the ISIR researchers a home when needed. Lydia was always caring for each of us in her own sweet way. Dominique learnt from Lydia how to bake bread and I learnt how to prepare peanut butter and both of these became important ingredients of our breakfast. The furniture of the house we later on rented in Teminabuan was made by the carpentry of Wim and his assistants.

Erin and Ron Hesse, an American family, offered us their warm friendship. Although it was inspiring to stay among people from a totally different culture, it was nice to share our experiences with people from a Western culture. Spending a night at their place for dinner and games was one of the few breaks from work we enjoyed. The freshly baked sugar and cinnamon buns Erin offered us every time we had returned from the field were delicious.

Even though there were hardly any chances of meeting fellow ISIR researchers in Irian Jaya, Dianne van Oosterhout en Wanda Avé always responded to my questions. As they were more fluent in Bahasa Indonesia than I, they helped me in addressing sensitive issues. My thanks go to them and other colleagues in the ISIR project.

Mr. Jacob Vredenbregt, representative of the Leiden University in Jakarta, gave advice on logistics matters we faced when leaving the country. Six boxes with survey questionnaires added quite some weight and costs (!) to our luggage. After having returned to Groningen, all these questionnaires still needed to be entered into the computer. Dominique Ducornez was prepared to take care of the data entry, a job he meticulously carried out.

Frans Bijlsma was kind enough to give his advice on the chapter on mortality.

I appreciated the friendly atmosphere at the Faculty of Spatial Sciences in Groningen, in particular at the Population Research Centre. My thanks go to Harrie van Vianen for scrutinizing the manuscript. The lay-out of this book is taken care of by Theo Smit, to who I am grateful for carrying out this job so well. He also relieved my work pressure in the last months. All the illustrations in this book are provided by Tamara Kaspers. Johan Zwart and Joop Arnolli, in charge of the computer infrastructure, always helped out whenever problems occurred. For questions on SPSS Melinda Mills was always prepared to help out. As quite a number of doctoral students were appointed round the time I started this project, there was ample opportunity for friendly exchanges of experiences.

With great pleasure I look back on the more than two years Elke Ennen and I were office mates. Sharing the pleasures and pains of our PhD research and our personal lives contributed to the joy I experienced in working on this dissertation. Together with Inge Hutter, we had enjoyable meals in town discussing many subjects. Also, Inge Hutter always offered to help and showed a sincere interest in the advancement of my work.

The readability of this book much improved after it was edited by Gina Rozario.

Miming Nijholt provided the Indonesian translation of the Dutch summary.

Last but not least, demographic survey research as outlined in this book is totally dependent on the co-operation of the inhabitants of the research area. It is only with their help and willingness that data of sufficient quality could be gathered. It is difficult to express how grateful I am to them for supporting this research in so many ways. Not only did they answer questions, they provided us with food and lodging, and guidance in the villages.

Groningen, October 1999

Contents

The demographic research as outlined in this book fits within a multidisciplinary research programme in the Bird's Head Peninsula of Irian Jaya, which aims to combine anthropological, linguistic, ethno-botanical, archaeological, geological, development administrative, and demographic research. This inter-university research programme is entitled 'Irian Jaya Studies, a programme for Interdisciplinary Research' (ISIR), which is a priority programme of the Netherlands Organization for Scientific Research (NWO). This programme is financed by The Netherlands Foundation for the Advancement of Tropical Research (WOTRO). The counterpart of the ISIR project is the *Lembaga Ilmu Pengatahuan Indonesia* (LIPI), the Indonesian Institute of Sciences. The ISIR programme started in January 1993 and has been targeted for a period of seven years. In the Dutch New Guinea studies, ISIR can be considered the successor of IRIS, the so-called Irian Jaya Studies Project (financed by the Dutch Ministry of Development). The IRIS programme started in 1987 and was a collaboration of the Irian Jaya Study Centre (IJSC) in Jayapura, Leiden University, *Universitas Indonesia*, and LIPI. The scope of work IRIS was involved in was somewhat broader than that of ISIR. In addition to research related to Irian Jaya, it provided teaching and developmental aid.

Within the framework of the ISIR project the southern part of the Bird's Head peninsula was selected as area for research. More specifically, the *southwestern* Teminabuan area was designated as area of special interest, reflected in a programme of interdisciplinary research encompassing the fields of anthropology, demography, and development administration. The general theme of the ISIR project is the increase and integration of knowledge of the Bird's Head Peninsula of Irian Jaya, whereas the research theme specifically for the social sciences within the ISIR project is defined as 'movement of objects, persons, relationships, and ideas'. Fragmentary data from several reports (Memoranda of Conveyance; reports from missionary archives) suggest that Teminabuan constitutes a gateway through which the various movements took place (cf. Terms of Reference of ISIR project (1992); Elmberg 1968; Miedema 1994). This explains why the three aforementioned disciplines are logically involved in this research.

Apart from explaining the demographic parameters, the results of this research and projections on the development of the population composition could be very useful in the field of administration (in terms of the structure of settlement, demand for education, health care, farm land etc.). The information gathered in this programme will enable public officers to anticipate local patterns and habits. The need for such knowledge has been brought to light by, amongst others, the governor of Irian Jaya (1993). In addition, the survey methodology may provide a guide on how to conduct surveys in areas as inaccessible as Teminabuan and where a highly mobile population lives.

The Teminabuan area is inhabited by a variety of small population groups. These groups include indigenous groups (Tehit, Meybrat, Ogit, and others) as well as immigrants from Onin, Salawati, and other parts of Indonesia. In the course of time, integration between the indigenous groups has increased due to inter-regional trade relationships, migrations, and processes of pacification and state formation. At the local level the last two factors include

the processes of Christianization, village formation and the more recent *desa*[1] formation. However, notwithstanding these processes, many groups still form entities in themselves as reflected by the village settlement patterns, which are identical to patterns found in other parts of the Bird's Head Peninsula (cf. Memoranda of Conveyance; Elmberg, 1968; Schoorl, 1979; Miedema 1984, pp. 42, 53, 237; Groenewegen & Van de Kaa, 1967, p. 74).

The initial aim of the project was an in-depth study on migration. Mortality, fertility, and the socio-economic characteristics, obtained via survey research, were considered minor topics; they should provide broad background information on the population. However, during the feasibility study it soon became clear that a successful and meaningful development of both major and minor topics was beyond the ability of one person on a three-year assignment. Consequently, it was decided to limit the scope of investigation to a population survey in which the issue of migration was included as well, thus, ensuing coverage on all topics in the survey.

This research addresses four main questions.

1. *What are the levels of fertility and mortality, and what are the patterns of migration of the population in the southwestern part of the Bird's Head Peninsula of Irian Jaya?*

2. *How does mortality, fertility, and migration affect the composition of the population?*

3. *How does the demography in the Bird's Head Peninsula compare to the demography of Indonesia and Papua New Guinea?*

4. *What is the most effective way demographic and health data can be collected on a large scale, in an area with limited accessibility and a highly mobile population?*

In addition, we explore ways to exchange and integrate knowledge with the fields of anthropology and development administration.

In order to answer the research questions, new quantitative and qualitative data were needed. Quantitative data were gathered through the primary data collection of a survey research (May-September 1996). Qualitative information was obtained from interviews with

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[1] During the Dutch administration, the population was encouraged to live more or less permanently in villages or smaller units (*kampung* [hamlet]). Usually, 2-4 *kampung* fell under the administration of one village. Since the National Law (1979/No. 5) on Village Administration, 10 villages (*desa*) were distinguished in Teminabuan subdistrict. In practice, this division was insufficiently effective. Therefore, the governor of Irian Jaya decided to have the local government reorganized. Instead of 10 villages and 20 hamlets, there would be 30 villages supplemented with the *kelurahan* Kaibus. A *kelurahan* is an administrative unit somewhat bigger than a *desa*. These villages are the so-called *desa-POP* (*Pola Operasional Penyelenggaran Pemerintahan*). Accordingly, the national government used this division as a basis for the distribution of IDT (*InPres Desa Tertinggal*) funding for socio-economic support. Thus, being accorded the status of village is important because a village qualifies for IDT funds.

informants (the survey team, villagers, and local officials) on selected topics. These data were supplemented with literature study and reference to secondary data. Fieldwork, that is a population survey of some 1,400 households (ca. 6,200 individuals), provided the data set on which meaningful analysis of the research population could take place. The survey was conducted in twenty villages in the Teminabuan area. In January-February 1996, a familiarization tour was made to the 31 villages of the Teminabuan area by the researcher and an assistant with the intention to establish rapport, introduce themselves and the the planned research. At the same time an inventory was made of the workload, obstacles and socio-economic and environmental characteristics of the villages. Following this, local assistants from the Teminabuan subdistrict were selected and trained to assist in conducting the survey. The whole team, including the researcher, worked at one location at a time. This enabled the researcher to immediately follow up on completed household questionnaires which were incorrectly administered and to supervise the process of data collection as closely as possible. The question items of the survey questionnaire elicited information about the household composition, date of birth of the household members, births and deaths since 1990, causes of deaths, movements of adults since 1990, reasons for movement, fertility histories of ever-married women, the social-economic situation of the family, education, mother tongue, and the like.

Groenewegen and Van de Kaa (1965, Dl. 2), Hugo (1988), and Caldwell (1988) provided valuable advice on the application of the research method. Both Hugo (1988, p. 382) and Groenewegen and Van de Kaa (1965, pp. 23-24) indicate the importance of intensive field study preceding the selection of the actual research villages. As a prelude to the actual survey research, informative meetings with the village population, in which the research, researchers, and assistants were introduced, proved invaluable in engendering cooperation. Working with assistants from the research area greatly benefited the study in terms of access to knowledge on social norms and local traditions. With regards to the actual interviewing, Hugo advises the researchers to conduct at least some of the interviews themselves and to randomly sit in on interviews conducted by the assistants. The continuous presence and supervision at the research site intensifies the researcher's bond with the research population. Direct involvement of the researcher at every stage of the research is also advocated by Caldwell (1988, p. 469). Groenewegen and Van de Kaa (1965, Dl. 2, pp. 29-36) drew attention to the difficulties we were likely to encounter in determining the dates of demographic events such as birth, death, or migration movement.

Exchange and integration of knowledge with the disciplines of anthropology, ethno-botany, history, and development administration took place during all stages of the research. The acquired insights are incorporated in this book. Disclosure of crystallized (and published) results are envisaged to provide more opportunities for further integration in future. Besides, abundant use has been made of insights from other disciplines not represented in the ISIR project. These insights were obtained from literature study and discussions with specialists, especially where fertility and mortality were concerned. Knowledge on human (reproductive) life was drawn from the information provided by the medical sciences.

The outline of this book is as follows. This introductory chapter, in which the research questions of the demographic study are discussed, is succeeded by a chapter on the methodology *(Chapter 2)*. *Chapter 2* gives an account of the selection of research villages and the calculation of the sample size. The design of the questionnaire is described together with methods to upgrade the quality of time-related data. Attention is also given to the fieldwork involved: the selection and training of the assistants as well as the daily survey routine. Especially the last-mentioned should provide the reader with an understanding of how the team conducted its work for a period of one year, of which the survey alone took up almost four months.

The characteristics of the research area and the study population are discussed in *Chapter 3*. Aspects of the area, such as the location, its historical development, physical environment and climate are also provided in the course of the chapter. These factors constitute the environment in which population change takes place. They therefore affect the population processes of fertility, mortality, and migration. Furthermore, the chapter deals with the living and socio-economic conditions of the population. Chapter 3 ends with a list of population characteristics, such as age, sex, educational level, marital status, and other aspects which emerged from the household survey.

As growth and decline of the population - age- and sex-specific - determine the population composition, it is important to analyze the processes of fertility, mortality, and migration. These analyses are done in the context of the study population. The processes of mortality (*Chapter 4*) and fertility (*Chapter 5*), and the variables which affect them, are studied with the help of the models formulated by Mosley and Chen (1984) and Bongaarts and Potter (1983), respectively.

In the analysis of mortality, Mosley and Chen's model (1984) includes a list of proximate and socio-economic determinants of under-five mortality. The level of mortality of today's population is described with an emphasis on infant and child mortality, as they are seen as the most useful indicators of the state of development. Conventional demographic methods as developed by the United Nations (1983) are used to calculate the level and pattern of mortality.

In the fertility analysis, the model of Bongaarts and Potter (1983) is selected to describe the pertinent variables and to measure their magnitude. Bongaarts and Potter (1983, pp. 1-5) identify seven proximate determinants of fertility. These proximate determinants are: marriage, contraceptive use, induced abortion, postpartum infecundability, natural fecundability, spontaneous intrauterine mortality, and onset of permanent sterility. Socio-economic factors, health, and nutrition are the factors which affect the proximate determinants (Bongaarts and Potter, 1983 p. 14). An effort is made to describe to what extent these determinants contribute to the fertility rates that are found. As the Demographic and Health Surveys (DHS surveys) conducted worldwide, also use the models of Bongaarts and Potter for fertility analysis and Mosley and Chen for analysis of child mortality, this allows the possibility for comparison of the research findings with data of the Indonesian DHS survey of 1994.

Chapter 6 focuses on migration in the research area. The patterns of migration discussed are: degree of permanence, direction of migration, and the characteristics of the migrant. The characteristics of the migrant are studied according to Pryor's (1979) typification of the Indonesian migrant. Besides the patterns of migration, the reasons for and consequences of migration are presented for the research population currently residing in the Teminabuan subdistrict. Out migrants are not included in this study.

With the aid of characteristics such as mortality, fertility, and migration, this study tries to shed light on the movements within the research population. With the help of background variables, the components of demographic change are analyzed. Thus, a composite effect is achieved. The last chapter (*Chapter 7*) of this book summarizes the separate and composite dynamics of the population of Teminabuan subdistrict.

Chapter 2 Survey methodology

2.1 Introduction

Chapter 2 gives an account of the research methodology used for the survey. Data from the Monografi Kecamatan Teminabuan (Pemerintah Kabupaten Daerah Tingkat II Sorong, 1992a/b) and personal communication with co-researchers provided the framework for determining the sample. Selection of the actual research villages is based on the results of the researcher's feasibility study and the monthly population reports of October 1995 from all villages of the Teminabuan subdistrict (*Kantor Camat* Teminabuan, 1995). For comparability purposes, the survey questionnaire is based on the much used Demographic and Health Survey and the World Fertility Survey questionnaires. The selection of the research villages and the survey assistants could only proceed once we were in the field. The final section of this chapter reports the inevitable setbacks that were faced during the fieldwork.

2.2 Selection of the research population and calculation of the sample size

Sub-section 2.2.1 describes how the population under study was selected. This is followed by Sub-section 2.2.2, which gives an outline of the calculation of the sample size necessary for a meaningful demographic analysis. Sub-section 2.2.3 reports on the criteria applied for the selection of clusters while 2.2.4 identifies and describes the characteristics of the research villages.

2.2.1 Selection of the research population

Compared to the rest of Indonesia, Irian Jaya is one of the most backward provinces with respect to economic development. However, as development takes place more rapidly, one can anticipate changes to local characteristics in the near future. Such changes will affect many aspects of an area, for example, the language used in daily life, source of income, household economics, environment, and the relationship of the people to their environment. These and other changing characteristics can have a more or less profound impact on the existing demographic parameters. It is therefore interesting to examine the demographic situation and how the background variables influence the demographic parameters. In addition, past research indicates noteworthy population processes in the area of Irian Jaya, for example the way in which the population composition is affected by the demographic parameter of migration and how migration in turn affects other demographic parameters such as mortality (cf. Groenewegen & Van de Kaa, 1964, dl.1, pp. 74-75).

Within the Bird's Head area, there are two primary reasons which highlight the value of focusing on Teminabuan subdistrict for demographic research. First, no demographic research has yet been carried out in the southwestern part of the Bird's Head Peninsula. Second, fragmentary data from several reports (Memoranda of Conveyance; reports from missionary archives) suggest that Teminabuan forms a gateway between Onin, Salawati and other areas located outside the mainland of the Bird's Head, and the interior of southwest Bird's Head Peninsula. It is through this gateway that the movements of people, goods and ideas took place. As a result, the economic characteristics (e.g. export of birds of paradise and copal), socio-cultural characteristics (e.g. introduction of new initiation rites into the hinterland, the rise of a bride-price system and a related ceremonial exchange system) and socio-structural characteristics (e.g. the increasing social stratification) have undergone changes in the area under study (cf. Terms of Reference of ISIR project, 1992; Elmberg, 1968; Miedema, 1994). This movement of people, goods, and ideas may have had consequences on various demographic processes such as the accessibility of health services, and therefore, fertility and mortality, or the feasibility of the *Repelita* (the five-year development plans) and thus, the level of economic development.

As mentioned before, the Teminabuan area is inhabited by a variety of small population groups who are all included in the survey. They consist of indigenous groups - Tehit, Meybrat, Ogit, and others - of which the Tehit is by far the largest group, and immigrants from Onin, Salawati, Sulawesi, Ambon, and other parts of Indonesia. The fairly isolated settlements make the area interesting for demographic research as external influences are still limited.

Administrative boundaries were used to define the research population. Though partly for practical reasons, this also provides the opportunity to study how the various ethnic groups differ with respect to background variables and demographic outcomes.

2.2.2 Sample size calculation

The objective of this study is to present a representative picture of the study area with regards to population characteristics. At the start of the survey, the number of households and the number of inhabitants per village were only roughly known. Village records do not provide individual-level or household-level data. As such, cluster sampling proved the most suitable way of sampling this population (Rossi *et al.*, 1983, p. 36). The household is taken as a sample unit (for definition see Appendix 2.4). Past records showed the overall mean number of members per household at 5.0 (*Kantor Camat* Teminabuan, October 1995; see also Appendix 2.5). Our survey, which included 1,401 households, yielded 6,254 individuals and therefore a mean number of 4.46 members per household.

The sample size depends on how many subgroups of the population one wishes to study (Rossi *et al.*, 1983, pp. 157, 181). In order to determine the sample size for this survey population, fertility analysis is taken as the basis. Fertility is one of the major research topics which, because of the heterogeneity within the group, actually requires a vast number of women. To acquire numbers large enough to analyze mortality in any depth is beyond the

scope of this survey. Mortality analysis requires more cases than available in the entire research area. Furthermore, reliable mortality data is even harder to retrieve in a research area like Teminabuan.

The sample size is based on the characteristics of women. Each characteristic (e.g. age) should include sufficient cases for a proper analysis. Fertility analysis actually concerns the number of person-years lived by women of the sample. With the calculation based on this, enough numbers of person-years are guaranteed as every woman included in the fertility survey, depending on her age, has experienced several years in fertile period. However, the older the women, the more likely the fertility data are biased (e.g. by recall-lapse).

Fertility is predominantly dependent on the age of women. In fertility analysis it is therefore important to subdivide by age group and to ensure that there is a sufficient number of women per age group for a meaningful analysis. Usually, fertility is analyzed by five-year age groups. As a consequence, the sample calculation should take into consideration the age distribution of women as well as the age (group) specific fertility rates.

According to Spencer (cited by Young, 1987b, p. 320) a minimum of 20 births per year per age category of mothers are needed, above which change because of random variation is insignificant (cf. Rossi *et al.*, 1983, p. 157). According to Irian Jaya data, women in the age category 15-49 years of age constitute about 20 per cent (actually 22.2%) of the total population (Groenewegen & Van de Kaa, 1967, dl.5, p. 70). As a mean, 15.3 per cent of these women will bear a child over a period of one year (Young, 1987b, p. 324; cf. United Nations, 1983, pp. 62, 63, 69).

To determine the sample size, the number of women aged 15-49 is taken as a starting point because these women are in their reproductive period. Various methods of calculation are applied to verify the required sample size. The methods of calculation as well as their results are presented below.

Age groups 15-19 to 45-49 yield a total of 7 five-year age groups. The sample size can then be calculated as follows:
7 (age groups) x 20 (births per year per age group) = 140. Because these women are not proportionally distributed over the indicated age groups, this number is increased by another 20 per cent which then brings it to around 170. The size of the survey sample thus is 170 / (0.153 * 0.20) = 5,555 inhabitants. The desired number (for a meaningful analysis) of live births by all women in the age group 15-49 in a one-year period is divided by their individual probability of delivering a child over a one-year period, which again is divided by the proportion of this group in relation to the whole population.

An alternative calculation is applied to the age group of 15-44 years, as above this age birth rates are very low, which results in the following sample size:
6 (age groups) x 20 (births per year per age group) = 120. This is then multiplied by 120 per cent to make up for the unevenly distributed women over the six age groups as was done in

the previous example, resulting in 144. From this, it follows that the size of the survey sample is 144 / (0.153 * 0.20) = 4,705 inhabitants.

Another way to calculate the required sample size is:
Focusing on the 35-39 age group which has an overall age-specific fertility rate (ASFR) of 0.15 ([20/0.15]=133, rounded to 140), and the indicated age group constitutes 2.8 per cent of the total population, the sample size is: (140 / 0.028) = 5,000 inhabitants (Groenewegen & Van de Kaa, 1967, dl.5, p. 70).

From the above, a sample population of 6,000 is acceptable, as this is likely to provide a sufficient number of births per age group of mothers. With an average number of five members per household, a minimum of 1,200 households is required.

Where subgroups are more or less homogenous (e.g. the selected clusters, see Sub-section 2.2.3) in the sample, statements on (overall) fertility can be made if such a subgroup consists of at least 600 persons, which is about 120 households. As mentioned before, Spencer (cited by Young, 1987b, p. 320) indicated that a crude birth rate[1] (CBR) of at least 20 is required, while for the area the CBR is estimated to number around 35 per 1,000 inhabitants. Therefore, the size of these homogenous subgroups is calculated as follows: (20 / 35) * 1000 = 571.

2.2.3 Selection of clusters

As information on the physical characteristics of the research area and the (approximate) geographic location of the villages were already at hand, stratified sampling was considered appropriate. Stratification by physical characteristics is justified when differences in physical conditions may create differences in the choice of livelihoods (e.g. fishery, agriculture), accessibility of facilities, and so on, which, in turn, have an impact on the demographic processes. Clusters were selected according to their physical features. The relevant information was derived from the Monografi Kecamatan Teminabuan (Pemerintah Kabupaten Daerah Tingkat II Sorong, 1992a/b) and personal communication with J. Miedema (1995) and L.E. Visser (1995). Once in the field, the survey villages in each cluster were selected on the basis of the results of the feasibility study (see Sub-section 2.2.4). Only a minor adjustment to the classification of clusters was needed[2].

Five clusters (see Figure 2.1) were identified. These were distinguished by their location in relation to Teminabuan town:

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[1] Crude birth rate is the number of births in a population during a specified period divided by the number of person-years lived by the population during the same period. It is frequently expressed as births per 1,000 of the population. The crude birth rate for a single year is usually calculated as the number of births during the year divided by the mid-year population.

[2] There was no need for desa Wehali to form its own cluster, as it is very much like the other 'hill' villages. Wehali was therefore categorized within this group.

Cluster I: Eastern area. These villages are all located along the paved road to Ayamaru. This road has existed for several decades (since the 1950s), contributing to regular (trade) contact with Teminabuan town. Besides, every village in this cluster is located near a river, which allows the population to reach Teminabuan town also by boat.

Cluster II: Town. This cluster comprises the villages where the administrative centre of the subdistrict is located as well as the neighbouring villages. Women market sellers and schoolchildren walking back and forth are a common sight. Farming, fishing, and market activities are all carried out in this area.

Cluster III: Southeast coastal area. These villages are located at a distance of about one full day of rowing from Teminabuan town. It is a flat, marshy area where the most important means of living is sago[3] complemented by fish. The villages are located in a sandy area which is less favourable for growing crops such as vegetables.

Cluster IV: Southwest coastal area. Though also located in the marshlands, this area is more suitable for growing crops as it is more fertile. The landscape is more hilly with many waterways.

Cluster V: Hill area. As is indicated by its name, this is the most hilly area of Teminabuan subdistrict. Hills are as high as 1,000 metres and exceptionally broken ground and karst hills have to be crossed to reach the villages (Pemerintah Kabupaten Daerah Tingkat II Sorong, 1992a, p. 12). Although every village is located near a river, fishing is, surprisingly, not a favoured means of livelihood. Cluster V is the most suitable area for growing crops such as peanuts and green peas.

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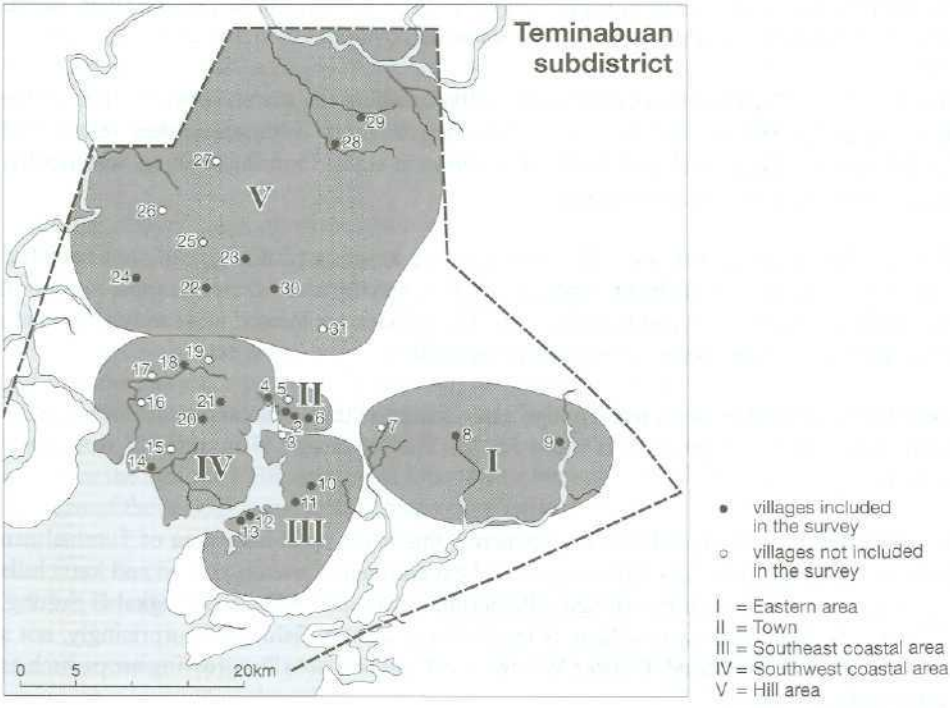
[3] Sago, which is derived from the pith of the sago palm, is the main staple food of the indigenous people. Sago palms are found in abundance in the marshy areas of Irian Jaya .

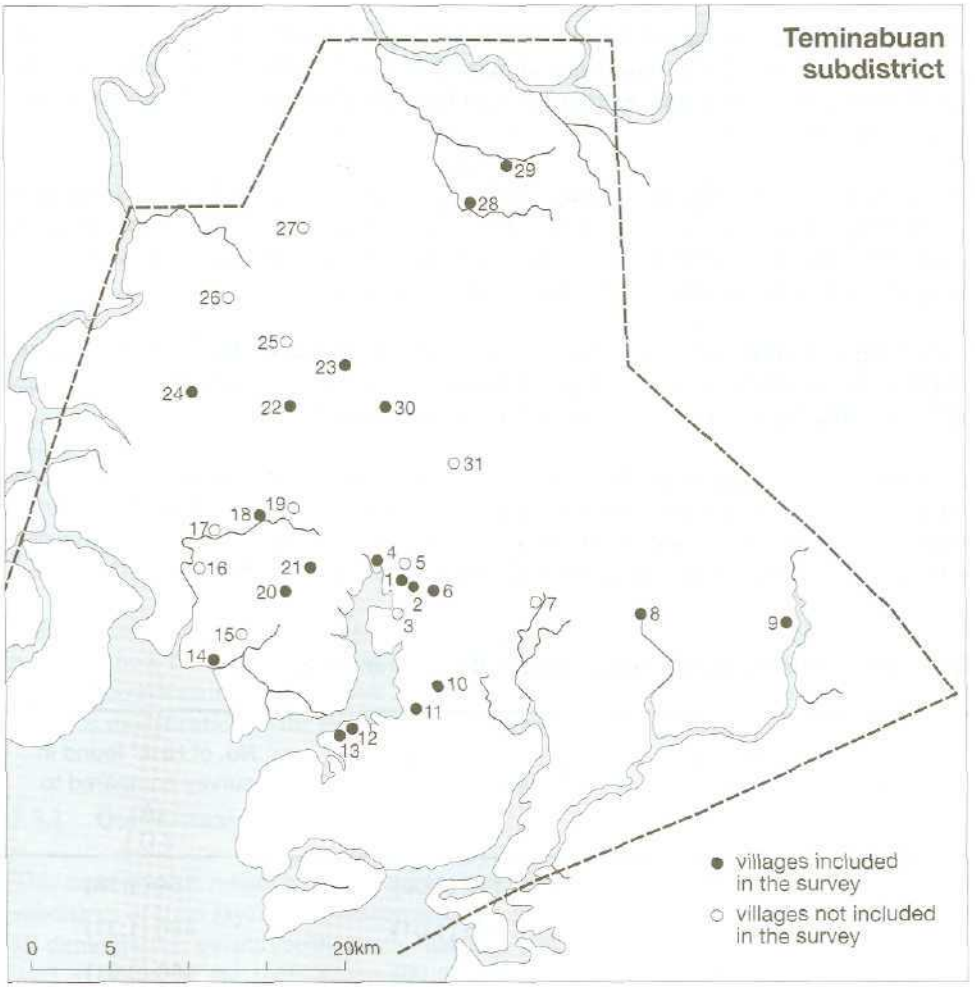
Figure 2.1 **Research clusters in Teminabuan subdistrict**



The subdistrict of Teminabuan consists of 31 villages (see Figure 2.2) which are distributed over the five clusters as follows:
Cluster I: Waigo, Sungguer, Keyen
Cluster II: Kaibus, Kohoin, Wermit, Aibobor
Cluster III: Konda, Wamargege, Bariat, Menelek, Wersar
Cluster IV: Haha, Woloin, Tofot, Sayal, Komanggaret, Sisir, Manggroholo, Mlaswat, Seribau
Cluster V: Wehali, Welek, Pasir Putih, Klamit, Mlabolo, Kofalit, Wenslolo, Sasnek, Sawiat, Eles

In the process of preparing the fieldwork in the Netherlands, the most recent population data that were available were those of 1993 (local enumeration by *Kantor Bupati* Sorong, 1993). These figures show a total number of households of 2,534 for the Teminabuan subdistrict, with an estimated number of 13,301 inhabitants. A sample proportional to its population size was selected from every cluster in order to represent the various clusters in a balanced way. With a target sample size of 1,200 households, it was decided to draw a 50 per cent household sample from every cluster, which would be sufficient to allow for losses due to non-response (as a result of absenteeism and/or refusals to cooperate) and other factors such as incomplete data (e.g. questionnaires which are filled out incompletely; inconsistent answers).

Figure 2.2 **Villages of Teminabuan subdistrict (including research villages)**



1. Kohoin; 2. Kaibus; 3. Wersar; 4. Seribau; 5. Aibobor; 6. Wermit; 7. Keyen; 8. Sungguer; 9. Waigo; 10. Manelek; 11. Bariat; 12. Konda; 13. Wamargege; 14. Sayal; 15. Komanggaret; 16. Sisir; 17. Woloin; 18. Haha; 19. Tofot; 20. Manggroholo; 21. Mlaswat; 22. Sasnek; 23. Sawiat; 24. Kofalit; 25. Wenslolo; 26. Mlabolo; 27. Klamit; 28. Pasir Putih; 29. Welek; 30. Eles; 31. Wehali.

2.2.4 Selection of villages: data, criteria, and results

For the selection of the research villages, the October 1995 population data (*Kantor Camat*, Teminabuan) provided the most recent data available which covered all villages. Population data collected by the researcher was incomplete due to the absence of the *kepala desa* (head

of village) and other representatives during visits. Therefore, more recent data on population figures of such villages could not be obtained.

Although the population figures in 1995 are somewhat lower than in 1993 (2,460 households compared to 2,534; 12,472 inhabitants compared to 13,301), the 50 per cent household sample from every cluster was nevertheless maintained to allow for a non-response level of 12 per cent (see below).

Living conditions may differ in the villages within a cluster because of differences in location, accessibility, natural resources and facilities, all of which consequently influence the demographic processes. For this reason, the villages were selected in such a way that together they provide a representative picture of each separate cluster.

Within a cluster small differences do exist, for instance, whether or not a village is located near a newly constructed road, which provides easier access to towns/markets or the presence or absence of a health post or a school (for details see Appendix 2.6).

Based on the village characteristics and the required number of households per cluster, the selection of villages according to their clusters is shown below. In instances where not all villagers in a village are selected for the survey, the percentage is shown. The total population (pop) and the number of households (hh) of each village is also given here.

Table 2.1 **Survey sample: target and reality, Teminabuan 1996**

Cluster	Given no. of HHs[a,c] (A)	No. of HHs[c] in selected villages[a,b] (B)	No. of HHs[c] found in survey compared to (A) (C)
I	260	142 (1.09)	154 (1.18)
II	737	375 (1.01)	486 (1.31)
III	394	210 (1.06)	160 (0.81)
IV	496	320 (1.29)	299 (1.20)
V	573	318 (1.10)	302 (1.05)
All	2,460	1,365 (1.10)	1,401 (1.13)

Sources: *Kantor Camat* Teminabuan (A) and 1996 Teminabuan survey (C).

[a] Data of October 1995, *Kantor Camat* Teminabuan.

[b] The relative size of the selected villages per cluster compared with a 50 per cent household sample is in brackets.

[c] HH = household.

With a target sample size of 1,200 households, this allows for some 12 per cent (165/1,365) non-response.

Cluster I: Waigo 66% (pop=326; hh=79) + Sungguer (pop=267; hh=63)
Cluster II: Kaibus 50% (pop=809; hh=129) + Kohoin 50% (pop=718; hh=136) + Wermit (pop=518; hh=110)
Cluster III: Konda 75% (pop=269; hh=72) + Wamargege 75% (pop=324; hh=66) + Bariat 75% (pop=127; hh=27) + Menelek 75% (pop=234; hh=45)
Cluster IV: Haha (pop=262; hh=45) + Sayal (pop=340; hh=42) + Manggroholo (pop=439; hh=61) + Mlaswat (pop=222; hh=47) + Seribau (pop=572; hh=125)
Cluster V: Welek (pop=278; hh=57) + Pasir Putih (pop=388; hh=92) + Kofalit (pop=187; hh=33) + Sasnek 50% (pop=179; hh=35) + Sawiat 50% (pop=258; hh=40) + Eles (pop=231; hh=61)

Initially, to safeguard the proportional size of clusters, only a certain percentage of the population in some villages were selected. However, during the survey it was discovered that the number of households indicated by the local authorities was somewhat overstated and so the decision was taken to include the total population of the selected villages except for the 'town-villages' of Kaibus and Kohoin. This decision proved appropriate, as can be seen from Table 2.1.

2.3 Questionnaire

This section discusses two main aspects of the questionnaire. First, a description of the items included, how the questionnaire was developed, and the target population for each segment of the questionnaire (Sub-section 2.3.1). Second, the political unrest necessitated some contents modification to the questionnaire (Sub-section 2.3.2).

2.3.1 Questionnaire and event chart

This demographic research is designed to assess the population dynamics in the Teminabuan subdistrict of Irian Jaya. As a consequence, the questionnaire (see Appendix 2.7) has to cover all demographic events (birth, death, marriage and marriage dissolution, and migration) as well as some of the socio-economic circumstances surrounding these events. First, the questionnaire is discussed, followed by the event chart, which was necessary for estimating dates of birth and death.

A. Questionnaire
The questionnaire is based on several existing survey and census questionnaires, such as the Indonesia Demographic and Health Survey 1991 (CBS *et al.*, 1992), the National Indonesia Contraceptive Prevalence Survey 1987 (CBS *et al.*, 1989), the Malaysia Fertility and Family Survey 1974 (WFS, 1979), the *Penduduk Irian Jaya: Hasil Sensus Penduduk 1990* (*BPS*, 1992), and Niehof's study (1985). Topics which were insufficiently treated were added.

The survey questionnaire is divided into three parts. It begins with a general section dealing with household matters to be filled out for every household. The respondent can be the head

of the household, or any other person competent to answer these general questions. The second part, concerning mobility, is intended for every household member of 18 years of age and over, and for those married but still under the age of 18. The last part of the questionnaire concerns marriage and fertility and is presented to every ever-married woman of the selected households.

The questionnaire was formulated by the researcher, with the help of L. Visser, in Bahasa Indonesia. With the input of the survey assistants its comprehensibility improved substantially.

It was anticipated that some, especially women living in the most isolated areas (in particular the northern hill area) would not be able to understand or speak Bahasa Indonesia sufficiently and that a version of the questionnaire in the local Tehit language was needed. Because the assistants originated from different parts of the research area, and therefore knew different dialects of the Tehit language, they worked together on the translation until a consensus was reached on its wording. The final Tehit version of the questionnaire was translated back into Bahasa Indonesia by someone else not involved with the survey so that mistakes and ambiguity could be remedied.

B. Event chart

Considering the fact that a substantial part of the population under study is illiterate and taking into account their way of life, it was expected that (estimation of) the date of birth as well as other dates would cause difficulties. In anticipation, an event chart (see Appendix 2.1) was put together and where possible, fine-tuned to each specific location.

An attempt was also made to focus on one specific life-event which the majority of the population would remember well, with the idea of relating it to other life-events. A specific life-events scheme (see Appendix 2.2) was developed with the help of the survey assistants, but the initial assessment showed that it was not effective in retrieving information[4]. According to the survey team and other informants, people would not be familiar with a certain event referred to and a historical event chart was preferred (cf. Lautenbach, 1998).

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[4] To help respondents date special life-events, this life-events schedule comprised events such as the first menstruation, age of marriage and first delivery. However this did not work out well. The pilot study and first survey outcomes gave quite disappointing results and included many guesses and quite a number of women also stated that they just did not know. For women who attended school, recalling the class they were in when they menstruated for the first time did not help either, especially in the villages where 'children' up to 25 years were in primary school. They started school at (sometimes widely) differing ages; classes doubled when children dropped out of school temporarily, etc. Another relevant life-event would be the age at marriage. However, many of the respondents just did not know the date of their marriage. Even young people - under 30 years of age - had little notion of time, age, and periods.

2.3.2 Abridgement of survey due to political upheaval

During the training course for the survey assistants, it became clear that due to the 1996 political unrest in the province of Irian Jaya, it would not be possible to obtain visa extensions for an indefinite period of time. Considering the amount of work entailed by the survey and the assistants' pace of work it was decided that the questionnaire should be abridged so that the survey could be completed by the expiry of the visa. This was considered exigent and, therefore, the following adjustments were made:

1. From the general part of the questionnaire, three questions dealing with the daily travel practices of every individual of the household were removed. Instead, questions on travelling related to income-earning or providing a means of living for the household in general, were inserted.
2. In the migration part, no questions were left out but minor adjustments concerned the omission of duration of migration and travelling time, as the latter varied with the weather and means.
3. The in-depth interviews and focus-group discussions, which were to provide us with additional information on the research subjects, had to be omitted due to this time constraint.

2.4 Fieldwork: selection and training of assistants

This section discusses the selection criteria (Sub-section 2.4.1) as well as the training of the survey assistants (Sub-section 2.4.2).

2.4.1 Selection of assistants

Before leaving for Irian Jaya there were two possible places where assistants could be recruited. One was the Teminabuan subdistrict itself, while the other was Sorong city, where there were quite a number of people from Teminabuan. It was also probable that they would be better educated. The selection criteria were women only, preferably married with children, literate, able, willing, and allowed to travel extensively, and able to speak the local Tehit language. The prerequisite of only female assistants is because fertility and other related subjects form a substantial part of the questionnaire. In order to obtain reliable answers, the female respondents should be made to feel at ease and free to give their opinion, which according to informants would be easier to achieve if the interviewers were of the same sex.

The Teminabuan subdistrict is in fact a less than satisfactory area to look for literate and educated assistants. However, just a few days after our arrival in Teminabuan it was fortunate that the local women's training centre (P3W *Pusat Pengembangan dan Pembinaan Wanita*) was nearing the end of its six-month course. Women from various villages of the Teminabuan subdistrict had participated in the course to be trained in various skills such as family welfare, household economics, reading and writing (for those who were illiterate), sewing, etcetera.

This gave a splendid opportunity to select women from different villages who spoke the various dialects, women who were willing to learn, and obviously women who were willing and allowed to stay away from their homes for several months on end. With the help of the manager of the training institute, seven women were selected. As this Christian training centre aimed to strengthen community-based development in the subdistrict, only indigenous women joined the course. It follows then that the immigrant population, who almost all live in Teminabuan town, were not represented in the survey team. Because of the differences in the cultural and religious background of both groups, this could and sometimes did prove to be a disadvantage. In an extreme situation, the better-educated and economically better off Muslim immigrants might take umbrage at being questioned by a simple Papuan village woman. On the other hand, our Christian assistants might feel reluctant to start a conversation with members of a group who differed so much in religion, economic well-being, education, and so forth, and they felt quite uncomfortable when respondents doubted the assistants' ability to administer the questionnaire. Assistants from various localities of the Teminabuan subdistrict not only guaranteed a good understanding of the local areas, but also made logistical arrangements easier. For instance, if porters or proas had to be arranged, there would always be someone with contacts in the area to be visited. In addition, it was a matter of pride for the village community to have one of their own members trained and working in the survey team. When balancing these pros and cons, and with respect to the fact that most of the time was spent in the villages among Papuans, a team consisting of only Papuan assistants was justified.

The places of origin of the five[5] assistants are as follows: the first two are from Teminabuan town, one with family-ties in the villages of Bariat, Menelek, and Konda (southeast), while the other with ties in the village of Wermit; the third assistant is from the hill area (Sasnek); the fourth from the southwestern island (Sayal); and the last was raised in a place situate between Teminabuan and the hills (Aibobor).

The educational level, marital status, and age of the assistants are as follows: one dropped out of Lower Secondary School (*SMP*) (divorced, aged 35); one completed *SMP* (single, aged 24); two completed Upper Secondary School (*SMA*) (both married, aged 20 and 25); and one completed higher education (married, aged 24).

2.4.2 Training of assistants

The training of the assistants was initially scheduled for three weeks but was later extended by another two weeks because of their overall low level of education and, hence, the rather slow speed of learning. The training took place in the building of the local women's training centre, which provided a classroom, blackboard, and dormitory for the assistants from outside Teminabuan town. The training started with a simple test on reading and writing which

[5] Two of the initial 7 assistants dropped out when the survey was in progress.

showed that one woman (out of 7) could not read and write at the required standard and, therefore, had to be excluded from the team.

It is worthwhile noting that although the assistants had received varying levels of education (see Sub-section 2.4.1), normal daily life for all consisted of working on their (family) gardens and household activities. Living with and working in a survey team was a very different experience for them. The assistants with the lowest education should especially be commended for their tenacity in coming to grips with the questionnaire and their work attitude. In fact, they showed a high motivation to learn the work and perform the task to the best of their ability. Without their commitment, this survey would not have been possible.

The purpose of the training was not only to familiarize the assistants with the questionnaire but also to introduce them to the concepts of interviewing and surveying a population. Several of the aspects that were dealt with are as follows:

- how to establish rapport;
- how to (try to) be objective;
- how to behave so that the respondent feels at ease;
- what to do with refusals;
- what is suggestive questioning and how to avoid it;
- how to check and cross-check answers;
- why it is important to pose questions exactly as indicated in the questionnaire.

Key definitions, like household (see Appendix 2.4) used during the survey were also explained. In addition, the assistants were also briefed on the framework of the demographic survey, why Teminabuan had been selected as a research area, and the sample selection.

To get acquainted with the questionnaire, all questions were fully explained in the classroom and the assistants were encouraged to ask about anything which was unclear and to come up with suggestions about how to simplify the phrasing of the questions. Consequently, the questions became easier to understand and less ambiguous. When the questionnaire was translated by the assistants from Bahasa Indonesia into the local Tehit language, previously undetected ambiguities of the meaning of some of the questions surfaced. This further increased our awareness of where the difficulties lay while it gave the assistants a better grasp of the intended meaning of the questions.

The extended questionnaire (see Appendix 2.7) was practised in stages by means of role-playing. The assistants were also encouraged to memorize the answer categories so as to improve their skill in filling out the questionnaire. Quite a significant amount of time was spent on the calculation exercises concerning age, duration of breastfeeding, and so on. Knowing how to calculate the age at marriage when, for instance, the date of birth and marriage were provided, allowed them to check the plausibility of the answers given. Thus, they were able to immediately query the information if they had any doubts. As mathematics was poorly taught in schools, this and other kinds of calculations, had to be repeated several times.

In the discussions on issues related to the survey we gained a lot of valuable local knowledge about customs related to birth, death, and marriage. This information was useful for formulating answer categories for some of the questions in the survey.

In the last phase of the training programme, two successive pilot studies were carried out to identify problems in the clarity of the wording and in the order in which the questions were arranged. At the same time it also provided the opportunity to observe the population's response to the team and vice-versa, and to the questions.

Due to the assistants' low level of education, detailed training was required to prepare them to conduct interviews and to administer the questionnaires responsibly. Nonetheless, the major advantage of having women who were physically and mentally prepared to travel and live in various places and the fact that these assistants were acquainted with the local customs and language which facilitated progress, made up for any educational advantages which might have been gained if the services of immigrant women from Sorong were used. Besides this, all the villages except Kaibus, Kohoin, and Wermit, are almost exclusively populated by Papuans. Having a Muslim assistant on the team might probably have created some degree of consternation among the team as well as the population. A Muslim assistant would however have been advantageous when interviewing the Muslim population.

2.5 Fieldwork: survey

During the fieldwork, the survey was conducted and additional information gathered. Data was collected via interviews at both provincial and local ([sub-]district) level as well as from other sources. Health-related personnel (e.g. members of the provincial family planning board) and staff members of the local administration were interviewed while (health-) statistics and other relevant information were gathered from various other sources.

This section discusses the required logistics (Sub-section 2.5.1) and the survey procedure (Sub-section 2.5.2). Sub-section 2.5.3 describes the setbacks encountered during the survey and how they were dealt with.

2.5.1 Survey logistics

In addition to trained assistants, another important prerequisite for conducting the survey was the readiness and willingness of the villagers to be interviewed. To ensure this, letters were sent to the village leaders informing them of the schedule and stating what was expected of them and the villagers. These letters were issued and sent by the local authorities. During the initial exploratory visits to the villages it was explained to the village leaders and the villagers what the purpose of the survey was. The task of the village leaders was thus to ensure that the villagers were duly informed of the day of arrival of the survey team and estimated length of stay, and the villagers were kindly requested to stay in the village during that period. If, upon arrival, part of the population was out of the village (which happened at times when we

worked ahead of schedule), the village leader or any other representative of the *aparat desa* (local village authorities) had to attempt to notify these people so that they could be interviewed as soon as possible. Only in the villages of Konda and Wamargege, where the population were habitually away from the village for weeks to months on end, was this of little effect. Often it happened that if people who were out of the village came to know we were around conducting the survey, they voluntarily hurried back home so as not to miss the chance of being involved in the survey. Their enthusiasm to cooperate was gratifying.

The research area is very isolated and difficult to access. As a consequence, many villages can be reached only on foot, though quite a number can be reached by proa and some even by truck. People in the area are not accustomed to visiting other villages if there is no explicit need. Officially, they even need to get permission from the local authorities to visit. The assistants were very curious to see what the other villages of their subdistrict looked like and they were prepared to undertake the arduous travelling involved.

Because there was no photocopier available in the research area, all questionnaires were reproduced with the help of a duplicator. It took about two weeks to have them all processed and sorted out.

A substantial part of the food required for the team had to be brought in from Teminabuan town as there were usually no shops in the rural villages and household stocks were meagre. Vegetables and tubers/potatoes could normally be obtained in the villages themselves. Whenever a journey was on foot, porters were engaged.

The quality of medical and other facilities are generally low to non-existent. Working in a malaria-endemic area necessitated the inclusion of medical supply as well as preventive measures such as mosquito nets.

Originating from similar villages, the assistants adapted easily to the living conditions encountered in the villages. Travelling together from village to village, and sharing the same work and living conditions, created an atmosphere of camaraderie. Noticing how we dealt with the people in the villages and the information we collected, most of the assistants divulged more in-dept information about the traditions of the villagers, which would not have been forthcoming from the population given the short period of time. Likewise, we obtained information or stories which were being circulated. Living in the same house also gave the opportunity to discuss, in an unofficial setting, the peculiarities or incidents each of us had encountered during the day as a way of relaxation and to vent the day's stress. The assistants' familiarity with the culture was invaluable in having many issues explained and clarified for us.

2.5.2 Survey procedure

As previously explained, the study area was divided into five clusters. In each cluster two to six villages were selected depending on the number of people living in each village. The

objective was to complete the survey in all the selected villages of a cluster before returning to Teminabuan town to save time and energy. The survey schedule was planned together with the assistants in order to get them involved and feel responsible for their part of the work (see Appendices 2.3a and 2.3b).

The following illustrates how the survey proceeded in the villages. Upon arrival in a village we contacted the village leader, who - if present - usually provided us with one or two rooms in his house. After settling in and a chat, we would address the villagers elucidating the purpose of our visit and introducing the team. Addressing them directly reduced any potential suspicion and promoted goodwill with the population. We actually tried to schedule our arrival in the villages on Saturday or just before a religious festival. In this way we were sure we could address the majority of the villagers the next day in church after service. Many villagers still live semi-permanently in the village, commuting between their gardens and their villages weekly or even longer. A common practice is to return to the village on Saturday to join in the service on Sunday, and to leave again for the gardens the day after. By timing our visit in this way we could also ask them to stay on a little longer in the village. After we had addressed them in Indonesian, the assistant most familiar with the dialect of the village translated the message in the local language, which was always very well received. In places like Kaibus or Waigo, where people are either familiar with Bahasa Indonesia and/or speak a different local language, the population was only addressed in the Indonesian language.

If possible, all houses were numbered on the day of arrival, so we knew the total number of houses (workload) and their exact location. If we arrived in the morning, we started working in the early afternoon, otherwise we started the next day. With the survey questionnaires, we set out for the hilly area where only a minority of the population are proficient in Bahasa Indonesia. Monitoring and quality control were the main tasks of the researcher. This required supervision of the interviewers and assisting them, as needed, in administering the rather complicated questionnaire. Furthermore, the assistants were regularly monitored on how they interviewed, if they actually did interview, and if they used the event chart correctly. Some of the assistants required a lot of practice in using the data creatively to arrive at a sensible answer, instead of unnecessarily confusing the respondents. The *Daftar keluarga* (family chart), issued by the local authorities in 1995, that is, one year prior to the fieldwork of 1996, was not reliable. It recorded names, ages, and religion of the people but was, for obvious reasons, extremely inaccurate with regards to age. At first, the survey assistants were glad to have any answer to fill out the questionnaire and also, the respondents felt somewhat relieved to be able to show the family charts. But the assistants soon discovered that whenever they had failed to check the data they obtained with the historical event chart, they had to return to carry out this procedure. Estimation of age with the help of historical events was valuable in many cases and it sometimes worked out wonderfully which was very satisfying, while in other cases it was as imprecise as the *Daftar keluarga* itself. It proved to be hard for quite a number of mothers to report their offsprings' exact dates of birth. The year of birth could usually be retrieved, though not always the month and date of birth.

Besides quality control and monitoring, the researcher tried to conduct at least one interview a day in the hill area to stay in touch with the interview situation and the problems that were

arising with the questionnaire. This made it easier to understand the difficulties the assistants encountered. Another advantage of interviewing together with an assistant was that it showed them how to deal with unexpected interview situations. After having finished one or two interviews every assistant was supposed to return base. The questionnaires were immediately checked for completeness, inconsistencies, logic, plausibility, etcetera. This was a time-consuming but indispensable task. During this time, the assistant could take a break. If there was any omission, doubt on plausibility or whatsoever, the questionnaire was discussed with the assistant concerned which was very often the case. If the assistant did not have sufficient information to offer, she had to return to the particular household. This procedure was repeated until the questionnaire was filled out satisfactorily. Once all the households living in a particular house were interviewed, and the questionnaires properly administered and completed, the number designated to the house would be circled. This meant that the occupants could carry on with their activities and that the interviewing was over.

For the migration and fertility part of the questionnaire, we tried to interview the individuals personally. For the migration part, in cases of absence, return visits were made, though if in the end a person had still not been interviewed, we tried to retrieve the information from one of his/her household members. In filling out the questions on the marriage and fertility history, we depended mainly on the women. Because of the privacy of these issues, we tried to create a conducive atmosphere for the women so that they would feel comfortable and free to speak. Husbands and/or other male visitors were sometimes asked to leave. On a few occasions, it was, however, useful for the wife to have her husband near and to confirm her answers. Where a substantial number of offspring were involved, disagreements occurred between the wife and husband about their deceased children. If the woman was away, her husband was only allowed to answer on her behalf if he proved competent and truly cognizant of facts such as dates of birth, duration of breastfeeding, contraceptive use, and the like. As to be expected, only men who worked in a health related sector were the ones who were most aware of such details.

By the time the first cluster was finished, the researcher was able to conduct interviews in Bahasa Indonesia for most of the day. This was possible not only because Bahasa Indonesia is more widespread in the other areas of the subdistrict but also because the researcher had by then gained sufficient fluency in the language to interview without the help of an assistant. Above all, this proved to be of help to the assistants when they were accompanied in their task of interviewing, because they could share their experience and the intense work of interviewing. Because of improvement in the work of the assistants, less (though still considerable) time was needed to check the questionnaires. While working on the first cluster, both the researcher's husband and the researcher were occupied full-time in this task. In the subsequent clusters, it was to a large extent done by the researcher's husband. All in all, the researcher interviewed 14.6 per cent of the households (n=1,401) herself.

Though Bahasa Indonesia is fairly common, there are other villages, also outside of the hill area, where the local language is the main language. In about 12 per cent (n=1,383) of all interviews conducted, the local language was the only language used. In the hill as well as the southwestern areas this was some 25 per cent (n=297). Households that used the Indonesian

and local languages simultaneously during the interview amounted to slightly more than 50 per cent (n=297). The various dialects of the Tehit language are usually mutually understood. In rare cases where the respondent did not understand the dialect spoken by the interviewer, another assistant most familiar with the dialect of the respondent was asked to take over that particular interview.

It happened every now and then that families, who were not interviewed because of their absence at the time of our visit to their village, were later interviewed in Teminabuan town. The people themselves would inform us or one of the assistants would know of a specific family or person living in their quarter of Teminabuan town who actually reside in one of the survey villages. We gratefully included these people in the survey as it helped us meet the targeted number of households.

2.5.3 When things do not go as they should

This sub-section subsequently deals with the following setbacks which we faced during the fieldwork: a. Uncooperative village leaders, b. Gossip, c. Number of inhabitants, and d. Uncooperative team members.

A. Uncooperative village leaders
As mentioned in Sub-section 2.5.2, it is important to get together with the population of a village before starting off the survey. A gathering provided a good opportunity to answer questions or allay any suspicions they might have about the purpose of the survey. Is also gave us an opportune time to stress that although we had the sanction of the local officials, the research in itself was independent. In addition, it provided a way of (re-) introducing ourselves to the villagers. As some village leaders were not very cooperative in arranging this meeting, we encountered even more suspicion. More time was spent talking and explaining in each and every house before the actual interviewing could start in those villages. It is not unlikely that this affected some of the interviews. If we detected resistance among the population we would again request the village leader to arrange a meeting, which usually was agreed to (in 4 out of 5 cases). If the village was too big, like in the villages of Wermit, Kaibus and Kohoin, to gather all the people at the same time, we then tried to reach the people by addressing them after service in church. As there are a few churches in these villages, and depending on which section of the village we would work in next, the respective church was selected for that particular week. Without exception, this was very well received. For the Muslim community clustered in Kaibus, we were not successful in having a gathering arranged. The Muslim group concentrated in the market area required a lot of contact time before we gained their cooperation, and though this was not achieved with all of them, once the respondent agreed to the interview, it usually progressed well. A reasonable speculation could be that all the survey assistants were Christians or appeared to be associated with the Christian faith. Though it did indeed take more effort to reach this segment of the population, we do not have the impression that it has adversely affected the quality of the data. As a matter of fact, considering the background and educational status of the Muslim population, they were usually more aware and precise in recalling dates of birth and the like.

B. Gossip

Occasionally, the village leader would be away when we arrived to conduct the survey. This did not matter as long as there were other representatives of the local bureaucracy whom he instructed to act on his behalf or if he had informed the population beforehand. Any uncommon event, particularly one that is externally organized, would appear less threatening if the villagers knew of it in advance and especially through their leader. In one village we faced the situation where the leader was away and not only had he neglected to inform the population but most of the other members representing the local authority were also absent. As a consequence, the reception was lukewarm, and we were suspected of belonging to a political party. It was obvious that there was a problem. The kind of problem only became clear with the help of our assistants, who quickly picked up the gossip (in the local language). Thus, we postponed the interviews and tried to organize a meeting with the people instead. This was first discussed with the spokesmen of the various living quarters, who then made it possible to have a meeting arranged. Here again it showed that once the population was informed about who we were and what the purpose of the visit was, they all became very cooperative.

C. Number of inhabitants

After the survey of the first village it was evident that the actual number of inhabitants was far lower than that indicated by the local authorities (see Table 2.2). Likewise, the number of households in the villages was often, though not always, lower than what the official statistics indicated.

Table 2.2 **A comparison of the number of inhabitants and households for some selected villages of Teminabuan subdistrict: official statistics vs. the 1996 Teminabuan survey**

Name of village	Official statistics October 1995 inhabitants/no. hh[a]	Survey statisticsMay-Sept 1996[b] inhabitants/no. hh
Welek	278 / 57	188 / 39
Sungguer	276 / 74	255 / 63
Sayal	340 / 42	332 / 75
Haha	265 / 45	191 / 48
Seribau	572 / 125	446 / 94

Sources: *Kantor Camat* Teminabuan; 1996 Teminabuan survey.

[a] no. hh = number of households.

[b] These numbers include those who were temporarily away from the village at time of the survey.

As the selection of the sample size was based on the official data, the reality in numbers meant that it would be a problem to attain the minimum number of 1,200 households to ensure a meaningful analysis of the fertility data. Furthermore, the proportional representation of each cluster according to size had to be taken into account as well. This over-estimation of number of households and inhabitants did however not occur in every village. The following steps were taken to rectify the deficit. In the original sample there were three clusters from which 50, 66 or 75 per cent of the selected villages would be included. These villages were selected to properly represent the characteristics of the area, but to stay within the boundaries of the proportional size of the cluster, they were not entirely (i.e., 100 per cent) included. Due to the mismatch in numbers, it became necessary to include all the households of these villages.

Villages located near the centre of Teminabuan town had more up-to-date records and therefore did not require an adjustment. Fortunately too, in one cluster there was a village with a higher number of households than indicated by the official data. This nicely made up for the deficiency found elsewhere in this particular cluster (see Table 2.1).

D. Uncooperative team members
Heavy workload, discipline, absence from the family, exhausting trips, and handling different situations continuously, demanded a lot from the team. Furthermore, the fact that civil servants earned wages far higher than the assistants, though with a workload which was considerably less, caused more friction. This resulted sometimes in less dedication to the work and rebellious behaviour from some of the team members. As one member's inability to share the sometimes limited food stock with her colleagues, besides trying to undermine the work by her attitude and behaviour, affected team spirit, we decided to dismiss her.

2.6 Summary

Despite the fact that the population data were not completely accurate at the time the survey villages were selected, the adjustments made on the basis of the information gathered during the feasibility study helped avoid pitfalls of possible misrepresentations of the villages and clusters. The overall low level of education of the assistants required more training than was initially foreseen. However, the great dedication of these women made the collection of qualitatively good data possible. Some setbacks were faced during the fieldwork, though none of them were so severe as to disrupt data collection.

Chapter 3 The research area and the study population

3.1 Introduction

The information presented in this chapter is based on various sources. The sources at the subdistrict level are our 1996 survey, the Monografi Teminabuan based on 1991 data, and a local enumeration conducted in 1993. The district authorities (*Kantor Bupati* Sorong) are responsible for last two sources. The Monografi Teminabuan and the local enumeration are based on material provided by the village leaders and the administrative staff at subdistrict level. The Monografi Teminabuan includes descriptions of a range of topics, such as the geography, administration, population, social services, and economy. The local enumeration only consists of a list of villages and the number of inhabitants, including the Teminabuan subdistrict. Historical data on the research area (and surrounding areas) and its population are derived from Memoranda of Conveyance written by several government officials (including Cappetti and Galis) and government doctors like H.W.A. Voorhoeve. This information is often based on small numbers, and the data provided are not systematically gathered. Therefore, it is not the figures from these reports which are the main focus of interest, but the often very detailed description of the living conditions and the traditions of the population. Sources on provincial (Irian Jaya) and national (Indonesia) level are the 1990 *Sensus Penduduk* (population census) and the 1994 Indonesian Demographic and Health Survey (IDHS). Data for these two sources are gathered systematically and on a large scale. The census data provide, amongst others, information on numerous household and population characteristics. The IDHS data (CBS *et al.*, 1995) focus on the aspects of fertility and infant and child mortality. Due to the differences in the data collection methods, the reliability of the various data sources differs, though it is difficult to say to what extent.

This chapter discusses aspects of the research area and its population in order to give an idea about the living conditions of the population. We focus on those aspects which are expected to influence demographic processes. Section 3.2 describes the physical features of the study area, Section 3.3 concentrates on the living conditions of the population, whereas the socio-economic conditions are outlined in Section 3.4. The chapter ends with an enumeration of characteristics of the research population (Section 3.5).

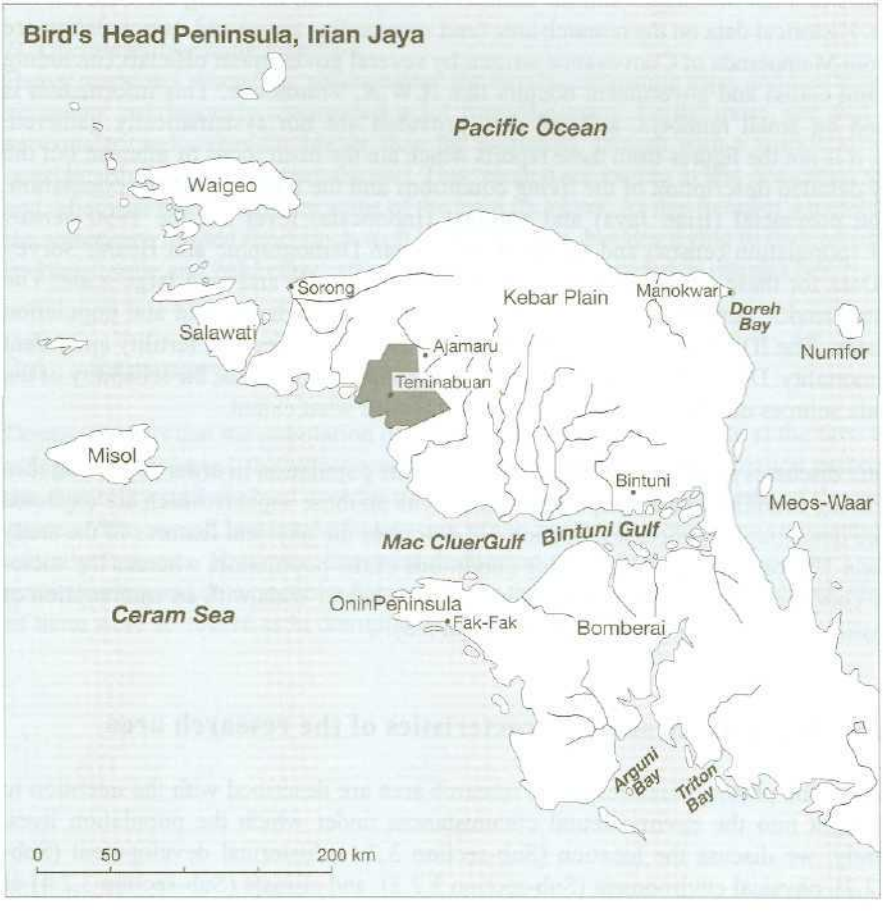
3.2 Location and physical characteristics of the research area

In this section the physical features of the research area are described with the intention to provide insight into the environmental circumstances under which the population lives. Subsequently, we discuss the location (Sub-section 3.2.1), historical development (Sub-section 3.2.2), physical environment (Sub-section 3.2.3), and climate (Sub-section 3.2.4) of the research area.

3.2.1 Location

The area under study is the Teminabuan *kecamatan* (subdistrict), located in the southwestern corner of the Bird's Head Peninsula, which in itself is the westernmost part of Irian Jaya, one of the 27 provinces of the Indonesian archipelago (see Figure 3.1). Teminabuan comes under the Sorong *kabupaten* (district), which roughly covers the western part of the Bird's Head Peninsula. The Bird's Head Peninsula is located just beneath the equator; between longitude 131°36 and 132°07 E and latitude 01°0 and 01°59 S.

Figure 3.1 **The location of the Teminabuan subdistrict in the Bird's Head Peninsula of Irian Jaya, Indonesia**



The geographical boundaries of the Teminabuan subdistrict as specified in the Memoranda of Conveyance by Cappetti (1961, p. 2) are (see Figure 3.1):

- western border: Seremuk River and northeastwards from Klambot until the Kladuk River;
- northern border: the Kladuk River until it forks into the Sedine and the Auk (or Sikoet (Veen, 1953, p. 2));
- eastern border: from the abovementioned fork, southwards until about 12 kilometre from the Ayamaru-Teminabuan road, and from this southeastwards until the Waromgei River, which flows into the Ceram Sea;
- southern border: Ceram Sea.

The Teminabuan subdistrict consists of 30 administrative *desa* (villages) and one *kelurahan*, an administrative unit somewhat bigger than a village. The villages of Kohoin and Kaibus together make up Teminabuan *kota* (town).

In Table 3.1 the population figures are listed for all the villages of Teminabuan subdistrict. In 1992, *desa-POP*[1], a provincial programme for the administrative reorganization of the villages, was introduced, which brought along a change in the administrative status of most of the villages in Teminabuan subdistrict. Until then the subdistrict included 1 *kelurahan*, 10 *desa* (villages) and 20 *kampung* (hamlets). Each hamlet fell administratively under one of the villages. *Desa-POP* changed the status of every *kampung* into a village (*desa*) if it met certain criteria such as a minimum population size. Because of this, the figures for what were considered *desa* in the 1991 data are not totally comparable with the 1993 data. However, when adjusting the population data of the 1993 enumeration according to pre-*desa-POP* criteria, i.e. the change in administrative status, the figures show some remarkable differences in the population size, number of households, and the mean number of persons per household. This is illustrated in villages such as Kohoin, Wersar, Konda, and Sisir. According to the figures from the Monografi 1992 (1991 data; Pemerintah Kabupaten Daerah Tingkat II Sorong, 1992a, p. 18) and the local enumeration of 1993 (*Kantor Bupati* Sorong, 1993), the total number of inhabitants of Teminabuan subdistrict increased from 11,925 to 13,301, and the total number of households increased from 2,179 to 2,534. The mean number of persons per household decreased from 5.4 to 5.2 over the period 1991 to 1993.

When comparing population figures of 1993 with those of 1996 (see Tables 3.1 and 3.2) it can be seen that the number of the total population for most villages is higher in 1993. Apart from actual population fluctuations, this can probably be explained by the fact that former villagers were still registered as inhabitants by the local administration even if they have long moved away (personal communication with village leaders). The reason is that their registration is linked to landownership. The Teminabuan survey includes only those persons who have not been away for more than six months and have expressed the intention to return.

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[1] See also Chapter 1, footnote no.1.

Table 3.1 **Population data for all villages of the Teminabuan subdistrict based on the 1993 local enumeration by *Kantor Bupati* Sorong**

Village	Males	Females	M/F ratio	Total population	No. of hhs[a]	Mean no. hh mem[b]
Welek	115	103	1.11	218	51	4.2
Pasir Putih	194	195	0.99	389	80	4.8
Kofalit	95	91	1.04	186	37	5.0
Sasnek	253	267	0.94	520	123	4.2
Sawiat	269	250	1.07	519	80	6.4
Eles	112	117	0.95	229	63	3.6
Bariat	107	111	0.96	218	55	3.9
Manelek	209	206	1.01	415	94	4.4
Konda	186	181	1.02	367	97	3.7
Wamargege	237	196	1.20	433	88	4.9
Waigo	228	224	1.01	452	90	5.0
Sungguer	108	91	1.18	199	54	3.6
Seribau	279	293	0.95	472	124	4.6
Mlaswat	175	183	0.95	358	59	6.0
Manggroholo	189	152	1.24	341	63	5.4
Sayal	186	167	1.11	353	60	5.8
Haha	122	135	0.90	257	61	4.2
Wermit	283	265	1.06	548	110	4.9
Kaibus	767	782	0.98	1,549	218	7.1
Kohoin	1,027	956	1.07	1,983	315	6.2
Wehali	162	145	1.11	307	66	4.6
Aibober	203	210	0.96	413	97	4.2
Wersar	209	204	1.02	413	133	3.1
Komanggaret	155	179	0.86	334	39	8.5
Keyen	178	148	1.20	326	57	5.7
Woloin	104	89	1.16	193	38	5.0
Tofot	91	69	1.31	160	35	4.5
Wenslolo	178	195	0.91	373	42	8.8
Mlabolo	72	65	1.10	137	30	4.5
Klamit	145	72	2.01	217	33	6.5
Sisir	147	175	0.84	322	42	7.6
Subdistrict	6,785	6,516	1.04	13,301	2,534	5.2

Source: *Kantor Bupati* Sorong, local enumeration 1993.
[a] Number of households.
[b] Mean number of persons per household.

Table 3.2 **Population data for the selected survey villages of the Teminabuan subdistrict based on the 1996 Teminabuan survey**

Village	M[a]	F[a]	M/F ratio[a]	No. of hhs[b]	Total popu-lation[b]	Mean no. of hh members[c]
Welek	86	90	0.95	39	188[d]	4.7 (176/37)
Pasir Putih	128	114	1.12	63	258[e]	4.1 (242/59)
Kofalit	66	63	1.04	30	138[e]	4.6 (129/28)
Sasnek	117	130	0.90	55	247[d]	4.4 (247/55)
Sawiat	138	154	0.89	86	358[e]	4.1 (292/70)
Eles	104	103	1.00	55	214[e]	3.9 (207/53)
Bariat	82	76	1.07	37	166[d]	4.6 (158/34)
Menelek	91	94	0.96	55	255[d]	4.8 (185/38)
Konda	153	140	1.09	85	398[d]	4.8 (293/61)
Wamargege	74	64	1.15	79	374[d]	5.1 (138/27)
Waigo	190	162	1.17	125	411[e]	3.2 (352/107)
Sungguer	101	100	1.01	63	255[d]	4.2 (201/47)
Seribau	170	164	1.03	94	446[d]	5.0 (334/66)
Mlaswat	87	89	0.97	45	210[d]	4.6 (176/38)
Manggroholo	181	184	0.98	87	386[d]	4.3 (365/84)
Sayal	139	149	0.93	75	332[d]	4.2 (288/68)
Haha	90	87	1.03	48	191[d]	4.1 (177/43)
Wermit	308	299	1.03	167	729[e]	4.3 (607/139)
Kaibus	503	479	1.05	383	1,834[e,f]	4.7 (982/205)
Kohoin	352	349	1.00	260	1,283[e,f]	4.9 (701/142)
Total selected villages	3,160	3,090	1.02	1,931	8,673	4.4 (6,250/1,401)

Source: Teminabuan survey 1996.

[a] Survey data; M =Males; F=Females.

[b] Total number of households and inhabitants in selected villages; those interviewed and those temporarily absent.

[c] Based on survey data only, with the number of household members/households interviewed during the survey given between brackets.

[d] The total number of inhabitants comprises number of household (members) encountered during the interview, and the number of persons absent from the village.

[e] The total number of inhabitants is calculated by multiplying the number of household members of the households interviewed by the inverse of the fraction of the households interviewed. This method was only used in cases where there was no opportunity to determine the number of inhabitants of each household which was not included in the survey.

[f] In the villages of Kaibus and Kohoin, only about 50 per cent of the population was selected to join the survey.

3.2.2 Historical development of Teminabuan

In 1828 the area west of longitude 141° E, the present-day province of Irian Jaya, was officially proclaimed part of the Dutch Indies. It took however until 1898 before the first administrative centres were established by the Dutch Indies government in Fak-Fak and Manokwari, followed by Merauke in 1902. Besides colonial administrative posts, missions played an important role in the development of Irian Jaya as well. The Protestant missions were established permanently in Irian Jaya since 1855. Its first two missionaries, Otto and Geissler, whose 140st anniversary of their arrival in the area was celebrated during our field stay in 1995, were based near Manokwari in the northeastern part of the Bird's Head Peninsula. Roman Catholic missionaries established their first post on Dutch New Guinea in Merauke in 1905. In fact, the colonial administration and the missions shared a cooperative relationship. The mission was helpful to the administration through their work in the fields of education, health, and other 'developmental' work, while the administration safeguarded the peace and constructed some elementary infrastructure, from which missionary work could benefit. Between the First and the Second World Wars, the colonial administration slowly expanded in Dutch New Guinea. Japanese military occupation lasted from 1942 until 1944 when Allied forces helped restore Dutch colonial rule. From 1944 onwards until about 1950, the administration, with its limited means, slowly recovered from the setbacks experienced due to the Japanese invasion. It was not until 1950 when more financial means became available for the development of Dutch New Guinea. This was obviously a consequence of the increasing conflict with regard to the sovereignty of New Guinea among The Netherlands, Indonesia, and the international community, culminating in Indonesia's independence just after the Second World War. Anyway, more investments meant that the degree of development in New Guinea increased over the period 1950-1962. In 1962 the transfer of sovereignty became a fact (Schoorl, 1996, pp. 7-11). In 1963, Irian Jaya was incorporated into the Indonesian state, and formally annexed in 1969.

Colonial rule had been introduced in the area in the late 19th century. The Dutch had in fact already colonized the area south of the MacCluer Gulf, Onin with its administrative centre Fak-Fak, for some years when the political situation began to ease. This made them decide to also start pacifying the area north of the MacCluer Gulf in 1909, in order to put a stop to the supposedly frequent occurrence of murders and raids. This area was later on called the subdepartment Teminabuan which, at that time, included the districts of Teminabuan, Ayamaru, Aytinyo, Aifat, and Inanwatan. To achieve this, they tried to subdue the most powerful clans, to sentence or exile the organizers of the raids, and to occupy the area permanently (Cappetti, 1961, p. 4). Places along the Kaibus River such as Teminabuan, Konda, Wersar, and Seribau were founded in the period 1925-30 (Cappetti, 1961, p. 6). Village formation was encouraged by the *raja* (local kings) of Onin since 1910, when people from the inland attacked those living on the river banks. They positioned sympathizers near the banks and started to concentrate the population in a couple of villages (Galis, 1955, p. 6). Because the highlands were less accessible, there was less contact between governmental officials and the population, and pacification therefore only extended as far as the coastal areas. At the outbreak of World War II, when money and manpower were badly needed in Europe, the subdepartment Teminabuan ceased functioning. Only after the war did the Dutch start to reinvest in the area. In 1950, the main centre of the subdepartment Teminabuan shifted

from Inanwatan, where it had been since 1934, to Ayamaru, which was more centrally located in terms of the population distribution. However, because of the difficulties of getting supplies to Ayamaru and the difficulties in administering the not insignificant coastal areas from such a distance, the main centre of administration (*'onderafdelingshoofdplaats'*) was shifted to Teminabuan *kota* in 1955. According to Cappetti's Memorandum (1961, p. 7), Teminabuan *kota* developed rapidly and in 1961 the number of inhabitants was 1,131. At that time there were no privately owned shops; there was one government-run store providing just the basic necessities (Cappetti, 1961, pp. 7-8). The population itself was self-supporting with regard to food, though an exchange system allowed for variety in their diet. On specific spots along paths from the coast to the hinterland people would meet on set days to exchange fish and sago for tubers, sweet potatoes, and vegetables. This system has been common practice until recent times.

Compared to the surrounding coastal areas, the southern coast of Bird's Head is more difficult to reach due to a frequently turbulent sea. Lack of accessibility was a disadvantage for development. Also the centres of government and trade were, until 1955, located elsewhere. In the past, contact with people from outside the area took place via the population of the Onin Peninsula, especially at Rumbati and Patipi (during the times of the slave trade), and later on Fak-Fak and Kokas (when government posts were based in these places). Places such as Sorong, Steenkool and Babo had, because of the oil production, already much more contact with the outside world (Cappetti, 1961, p. 3).

3.2.3 Physical environment and transportation

The Teminabuan subdistrict covers an area of 2,357 square kilometres. In terms of elevation, about 48 per cent of the area lies below 50 meters, 18 per cent between 50-100 meters, 33 per cent between 100-500 meters, and only 0.5 per cent between 500-1000 meters (Pemerintah Kabupaten Daerah Tingkat II Sorong, 1992a, p. 12). From the map drawn by Hofman (1956), there is a small strip of lowland adjacent to the swampy areas which is located along the coast and the Kaibus River. Northeastwards, the lowland quickly passes into karst and hilly country. The lowlands are characterized by very poor drainage. The main reason is that the lowlands are actually at sea level. Furthermore, the soil of the somewhat higher lying areas is extremely impermeable, giving rise to extended marshlands. These physical features make the lowlands of little use for agricultural purposes, and besides, the area is considered unhealthy because of a high prevalence of malaria. The only resources which can be exploited are sago, wood, and other products from the forest (Hofman, 1956, p. 5).

The landscape south of Teminabuan town is characterized by large swampy areas near the coast and the estuaries. Marshlands are covered with light mangrove. The flat, swampy areas south of Konda are prone to the tide. Salt and brackish water mangrove is found as far north as the rivers and the arms of the sea. Further inland, this forest passes into fresh water mangrove. Types of soil on the lowlands, located just north of Teminabuan town, are swampy soil, sand and clay, riverbanks, and loam and clay. Heading further north, one comes across extremely broken ground with steep, comb-shaped limestone ridges. Here, one finds karst hills, where the soil is alkaline, loam, and sandy loam (Cappetti, 1961, pp. 11-12). Wild sago

grows in the lowlands, especially in the confines between the swamps and the marshlands, and beyond the banks at the lower reaches of the rivers. Sago is usually found growing among other kinds of vegetation (Hofman, 1956, p. 9). Only those parcels of land which are located in places where the landscape is moderate can be used for agricultural purposes. As a result, the villagers' *ladang* (garden) are sometimes located at quite a distance from their home. Sago is the staple diet since it is most available. An outcome of this agricultural system is that the diet of the people is fairly fixed and they have to put in quite some effort (travelling time) to ensure some variety in the diet. Another consequence of the landscape and the travelling required to obtain a variety of food products is that socialization with people from other villages is regular. Therefore, the groups of people living in this area of the Bird's Head Peninsula are not as isolated as they are sometimes believed to be.

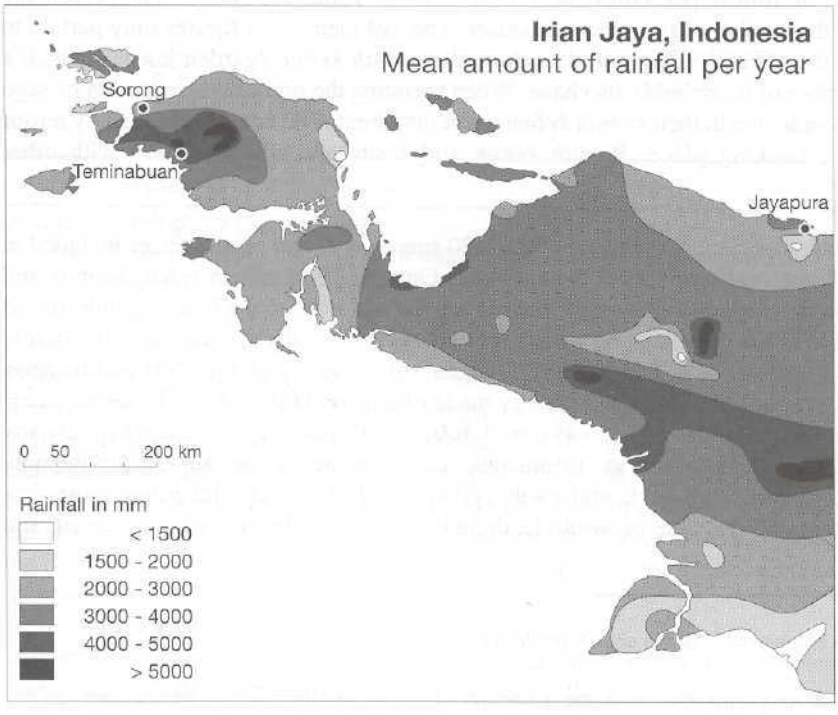
As can easily be imagined from the description of the landscape, few sealed roads have been constructed in Teminabuan subdistrict. In the 1950s the Dutch constructed a 35-kilometre metalled road between Teminabuan town and Ayamaru. Though there have not been any major repairs on the road ever since, it still is the best road in the whole subdistrict for motorized transport. In the 1990s, the road from Ayamaru was extended via Sorowan, Pasir Putih, Klamit, Mlabolo, to as far as Kofalit in 1996. Westwards from Teminabuan town a bulldozer made a track to the villages of Seribau and Haha in 1996. These roads are however unpaved and only accessible by motor or truck in dry weather. The slopes of some parts of the road near Kofalit are definitely too steep for any vehicle irrespective of the weather condition. In the lowlands a lot of travel is by waterway, while inland transport is mainly by foot along the footpaths, which are, depending on the rainfall, more or less usable. In fact, the rivers are of major importance as a means of transport. The following rivers are important for navigation in Teminabuan subdistrict. 1. The Kaibus River. Ships with a draught as deep as two metres can be sailed up to Teminabuan town. When there is a western wind along the south coast, the sea is usually too rough to sail and boats can not go offshore. With an eastern wind, the sea is normally calm and easily navigable. Big vessels sail about once every two weeks from and to Sorong; this provides the cheapest way of transport to and out of Teminabuan. Also the people from the subdistricts of Aytinyo, Aifat, and Ayamaru who use this means of transport board and alight in Teminabuan town. 2. The Seremuk River, which meanders deep into the interior of Teminabuan subdistrict, and 3. The Kamudan River. These main rivers have quite a few tributaries. However, not all rivers are navigable with the same kind of boat. Some rivers can only be negotiated by boats with hardly any draught and only at high tide. Motorboats ply the rivers a few times a week to provide transport to Sorong via Klamono, where people can go ashore and continue travelling by minibus. Until 1997 this route was only accessible in relatively dry weather but in 1997 a tarmac road was constructed. In the past, in times of heavy rain (which is most of the time) the minibuses could not reach Klamono and people had to walk for 4-12 kilometres before they could catch the buses from Sorong.

3.2.4 Climate

During the field research we recorded the temperature (at 7.00 a.m. and 12.00 a.m.), daily rainfall, and humidity (at 7.00 a.m.). However, as the measuring equipment was set up near

our house in Teminabuan town, recording only took place when we were there. With Teminabuan's location just below the equator, the temperature does not vary much throughout the year. In fact it fluctuates around 25° Celsius. The minimum temperature in Teminabuan town is around 25.4° Celsius (no. of observations = 141), and the maximum temperature around 30.9° Celsius (no. of observations = 94). In general, the yearly rainfall in the lowlands is between 3000-3500 mm, while in the hilly areas it is 5000 mm or more (see Figure 3.2). The rainfall is quite evenly distributed throughout the year. Usually, the number of rainy days per month ranges between 15 and 20. According to the Koppen classification Teminabuan has an Af type of climate, which means it is a warm climate where the mean yearly temperature does not drop below 18° Celsius. There is no single month with a rainfall of less than 60 millimetres (Pemerintah Kabupaten Daerah Tingkat II Sorong, 1992a, p. 7). Apart from the quality of the soil, the area is densely covered by lush vegetation (Hofman, 1956, p. 5). We recorded weather conditions for three complete months (March, April, and August 1996). During these months the number of rainy days were 18, 23, and 21 respectively, while the amount of rain was 118, 348, and 596 millimetres (cf. Cappetti (1961, annex II) who presents a ten-year mean for rainfall and rainy days over the period 1936-57). An overview of the yearly rainfall for Irian Jaya is presented in figure 3.2. The atmospheric humidity was on average 76.7 per cent (at 7.00 a.m.; no. of observations = 84).

Figure 3.2 **Mean amount of rainfall per year, Irian Jaya, Indonesia**



3.3 Living conditions

A description of the housing conditions, sanitary facilities, food availability and accessibility, as well as the health facilities available to the population, will add to the understanding of the general living conditions of the Teminabuan population. These topics are consecutively dealt with in the following subsections.

3.3.1 Housing

In Teminabuan subdistrict it is fairly common for households to share the same house with one or more households. The mean number of household members per household is 4.4. In 23.2 per cent (Teminabuan survey; n=1,401) of the cases two households share a house. Three households sharing one house occurs in 5.4 per cent of the cases. 1.4 per cent of the households share their living quarters with another three households; 0.4 per cent with another four households; 0.3 per cent of households have five other households living with them. Consequently, 69.3 per cent of households occupy a house by themselves. Because of the high mobility of the population this may in practice lead to less 'crowdedness' than the figures would lead us to believe at first. The fact that for more than 70 per cent (n=1,373) of the households farming or fishing is the main source of income means that these people are out in the fields or on the water for most of the day. Of all households, 27 percent (n=1,400) spend one or more nights outside the village before they return to their village home. The mean number of rooms per house is 2.5 (n=1,399). Table 3.3 shows the percentage distribution of the number of rooms in the houses. The just mentioned figures only pertain to the houses in the official villages and exclude the *rumah kebun* (garden house), which a substantial number of households also have. When spending the night in their garden or sago marshes, the people live in their *rumah kebun* or on their boat. The latter is covered by a roof and includes a cooking place. *Rumah kebun* and boats are seldom shared with other households.

Dwellings on stilts are prevalent in 17 out of the 20 survey villages; of all houses included in the survey, 71 per cent (n= 1,401) are on stilts. Only in Teminabuan town (Kaibus and Kohoin) and in the adjacent village of Wermit are the majority of the houses single-stored dwellings. While in the dwellings on stilts *gagar* (flattened tree bark) is the most frequently used material for the floor (52%; n=995), together with wood (28%; n=995) and bamboo (13%; n=995), ground level floors are usually made of concrete (89%; n=303). *Gaba-gaba*[2] is the main material used for walls (53.4%; n= 1,400); in 11 of the survey villages hardly any other material is used. However, in Teminabuan town, in the villages adjacent to the only metalled road in the subdistrict, and in the village of Haha, a special programme[3] has introduced the widespread use of wood. In the hilly area the villagers of Eles, Sawiat, and

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[2] *Gaba-gaba* is the mid-rib of the sago palm frond.

[3] Sometimes villages were selected by the government to implement (try out) new programmes, so that these villages could later be used as models.

Welek extensively use tree barks for their walls. Brick and concrete walls are obviously only found in houses with a concrete floor. Roofs are mainly made of fronds (56.1%; n=1,400), usually taken from the sago palm and sometimes from the nipa palm, or corrugated iron (40.4%). Villages located in the hilly and coastal area by majority have roofs made from foliage. The villages where the majority use corrugated iron as roofing are the same in number as those where the majority use wood for walls.

Table 3.3 **Percentage distribution of number of rooms in houses, Teminabuan 1996 (n=1,399)**

No. of rooms in house	Percentage distribution
1	22.8
2	31.7
3	27.4
4	12.9
5	3.4
6	0.9
7	0.3
8	0.6
9	0.1
Total	100.0

Source: Teminabuan survey 1996.

NB When counting the rooms of each house, the kitchen and verandah were excluded.

Of the households included in the Teminabuan survey, 88.2 per cent (n=1,401) primarily use firewood for cooking purposes, 9 per cent mainly use kerosine, 2.2 per cent use firewood just as often as kerosine, and only a tiny percentage (0.6%) use gas. For lighting a *pelita* (small can with a wick, filled with kerosine) is most common (66.1%; n=1,400), though electricity is used quite extensively in Teminabuan town (17.9%). In case money for kerosine has run out or kerosine is not collected from Teminabuan town, free sources of lighting available are: the fireplace, resin, and (resinous) sticks. A small 10 per cent of the households (n=1,400) use these sources of lighting all the time.

In Irian Jaya in general only the somewhat larger population centres have electricity supply. From the population census of 1991 we know that in the rural areas of Sorong district 91 per cent of the households use wood, and 8 per cent use kerosine as fuel. For this purpose very

few use electricity, charcoal, or something else. In the urban areas of Sorong district wood is less important (16% of the population use it for cooking purposes). Most (81%) of the households in the urban area of Sorong district use kerosine as fuel for cooking. Few in this area use electricity to cook, and even fewer use gas. The use of fuel for lighting is quite different from the one for cooking. In the rural areas of Sorong 55 per cent of the households use kerosine, about 16 per cent use a high-pressure lamp, while another 16 per cent use electricity for lighting. In the urban areas of Sorong district the majority of households (76%) use electricity for lighting, while high-pressure lamps are used in about 15 per cent of households, and kerosine in some 8 per cent (*BPS*, 1992, pp. 235-239). Ten per cent more concrete floors are found in Indonesia than in Teminabuan subdistrict (35.2%; n=33,738 to 25.6%; n=1,400). Because dwellings on stilts are prevalent in the area of Teminabuan, earthen floors are not common. In Indonesia on the other hand, earthen floors are found in as many as 25.9 per cent of the houses. In Indonesia, tiles (17.5%) and wood (15.9%) are the other main materials used for floors (CBS *et al.*, 1995, p. 21).

3.3.2 Sanitation

From Table 3.4 it can be seen that a relatively high proportion of households use river water as a source of drinking water in Teminabuan. That river water is so often used in Teminabuan is not extraordinary in itself as in many villages there are, except for rainwater, no alternatives. The percentage of households that use piped (river!) water is attributed to Teminabuan town and the adjacent villages of Wermit and Seribau. All in all, it shows that the population in Teminabuan subdistrict mainly obtains its drinking water from sources which are provided by nature. Teminabuan people differentiate between a well and a spring in the sense that water present in the earth is labelled a well, whereas water issuing from rock is called a spring. Most likely, wells and springs mentioned in the Indonesian data (CBS *et al.*, 1995) refer at least to some extent to man-made sources of water. The fact that the population of Sorong district and the whole of Indonesia live to a much greater extent in towns largely explains why they obtain water to a lesser extent from natural available sources. There are just too many people who depend on it. Also well water is more easily contaminated in a crowded city or town than in a small hamlet in Teminabuan (cf. Mboi, 1997, p. 127). Besides the just mentioned reasons there is the fact that households living in cities and towns, who dominate the Sorong and Indonesia data, usually have more access to wage work. They usually have the financial means to pay for water.

Fifty-one per cent (n=1,399) of the Teminabuan households state that they never drink the water untreated, while 45.8 per cent sometimes treat the water before drinking, usually only when they are in the village (and not when they are in their garden or sago marshes). Yet another 2.4 per cent never treat the water. Practically all households (99.9%; n=1,362) purify the water by boiling it.

Table 3.4 **Percentage distribution of households in the Teminabuan subdistrict (1996; n=1,401), Sorong district (1990), and Indonesia (1994) by source of drinking and bathing/washing water used**

	Teminabuan		*Sorong*		*Indonesia*
Source of water	drinking	bathing/ washing	drinking	bathing/ washing	drinking
Pipe-water	23.4	18.3	25.4	19.6	15.2
Pump	0.0	0.0	0.6	1.6	10.8
Well	12.4	14.8	39.7	54.4	50.4
Spring	16.0	12.0	10.0	8.5	16.2
River	49.7	57.8	8.1	11.5	4.8
Rain	4.9	7.5	12.7	0.6	2.1
Other	0.0	0.0	3.5	3.8	0.5

Sources: Teminabuan survey 1996; *BPS*, 1992, pp. 240-245; CBS *et al.*, 1995, p. 21.

NB Total percentage may exceed 100.0 per cent in cases where people indicated more than one source of water.

NB In case of the district of Sorong, the category 'other' includes those 'not stated' as well.

NB The data of Sorong district are to a large extent determined by the city dwellers as they constitute about 40 per cent of the Sorong district population.

The Teminabuan survey included a question on where the people go to defecate. With respect to hygiene and possible contamination of (drinking) water, this is important information. It seems somewhat unbelievable that such a large percentage of the Teminabuan households have a private toilet as indicated in Table 3.5, all the more when compared to Sorong and Indonesia. These private toilets are found in quite substantial numbers all over the subdistrict. Personal observation confirms that many households mark a creek, pit, or place behind the house as their private toilet.

Table 3.5 **Percentage distribution of sanitary facilities in Teminabuan subdistrict (1996; n=1,401), Sorong district (1990), and Indonesia (1994)**

Toilet facility	Teminabuan	Sorong	Indonesia
Private toilet	62.4	40.3	41.5
Public toilet	11.6	28.8	11.2
River, stream, creek	14.4		27.4
Bush, forest, yard	11.0		8.0
Other	0.5	30.9	11.9

Sources: Teminabuan survey 1996; *BPS*, 1992, pp. 250-251; CBS *et al.*, 1995, p. 21.

3.3.3 Nutritional and health status

According to Voorhoeve (1965, pp. 67-68) the population living along the coast and the big rivers of Irian Jaya mainly live on sago, which is found in the swamps. *Kangkung*, which is also found in the swamps, is eaten as vegetable. Infants are mainly given sago porridge as supplementary feeding. General nutrition is characterized by a lack of proteins. Fish and pork are only consumed in small quantities. From our observations it appears that the food consumption in Teminabuan subdistrict is not as monotonous as Voorhoeve observed during his period of fieldwork. Actually, we observed quite a variety of vegetables, fruit, fish, and meat. However, it should be mentioned that the products available on the market in Teminabuan town do not represent the variety found in the villages. A part of the market supply consists of products imported from Sorong town such as rice, coffee, tea, sugar, eggs, and tempeh. Besides, products, mainly (frozen) fish, are delivered by large fishing boats owned by non-Papuans non-resident in Teminabuan. Pork, venison, seafood, vegetables, sago, roots, tubers, peas, peanuts, and fruit from all over the subdistrict add to the variety of food items available for those who have the money to buy them. For those with (partially) a cash income and living in or near Teminabuan town this means that they have access to a very varied diet. For those living in the faraway located villages and those without a regular cash income, the variety in diet is much more limited. Besides the staple food of the area and some vegetables, the consumption of animal protein is very limited in these villages. As has been discussed in Sub-section 3.2.2, in former times people used to supplement their diet with food obtained from an exchange system.

Heering (1990), in her study on Indonesia concerning the relation between a mother's characteristics and the health of her children, came to the conclusion that education and place of residence (urban/rural) are of importance for the state of health of children under five years. Higher-educated mothers bore children at shorter intervals and terminated breast-feeding at

an earlier stage. A short birth interval proved to be significantly associated with children who were lacking in nutrition. A larger percentage of these children shows wasting compared to children of non- and less-educated women. Heering (1990, p. 26) found traditions of extended breast-feeding, early offering of supplementary feeding, and prolonged birth intervals still in practice in the rural areas and showed it benefited the children. Although children in rural areas are found to be more prone to growth retardation (height-for-age (HFA)), their weight-for-height (WFH) is on average better than those living in urban areas. Height-for-age is determined by chronic malnutrition rather than by short term or accute malnutrition. The latter shows itself in wasting (weight-for-age (WFA), WFH). Usually children who suffer from chronic malnutrition show an reasonable growth during the first 4 to 6 months, a progressive faltering till about 24 months, and a steady growth, parallel to standard curves but at a lower level, after age two (Heering, 1990, p. 22).

In tropical areas, morbidity is often characterized by high numbers of infectious diseases. In infant and child morbidity and mortality, it is usually not just one cause which leads to infant and child deaths. Generally, infant and child death is preceded by a chain of malnutrition and infections (Van Norren & Van Vianen, 1986). Weakened, it only takes a minor illness such as diarrhoea to cause the death of the young child. In developing countries child deaths are to a large extent attributable to diarrhoea (35%), malaria (20%), and measles and respiratory infections (14%). In 1984, one-third to half of the under-fives in Indonesia suffer from malnutrition (Heering, 1990). In Indonesia, diarrhoea accounts for 25 per cent of the infant deaths and for 30 per cent of the child deaths (1995 data; Departemen Kesehatan, 1997), which is quite similar to the percentages found ten years earlier (Heering, 1990). An estimated 38 per cent of infant deaths are caused by five diseases which can be prevented by immunization (Heering, 1990, p. 5). Chapter 4 of this book deals in more detail with the subject of (infant) mortality and causes of death.

3.3.4 Health services and medical programmes

Voorhoeve (1965, pp. 79-103) considered the government doctor Veeger to be the founder of the 'mother and child care' in Irian Jaya. Working in Irian Jaya from 1953 to 1958 Veeger judged the living conditions to be very poor and was struck by the high level of infant mortality. Voorhoeve (1965, pp. 100-101) mentions that he came across areas (Inanwatan district) where he found the infant mortality rate (IMR) to be as high as 200-275 per 1,000 live births, though he admits that these rates are based on small numbers (278 and 40 live births, respectively). He felt that women played a central role in influencing the living conditions of their children and the whole community. He therefore advocated to have local women trained as so-called village caretaker (*dorpsverzorgster*), with the purpose of improving the hygienic circumstances of the people. Later on, the main purpose of the programme became the reduction of the high infant and child mortality rates. Though not solely ascribable to the work of the village caretakers, the mortality rates of children decreased after they were appointed. (According to UNICEF (1997, p. 80) figures, the IMR for Indonesia decreased from 127 to 50 over the period 1960 to 1995, while over the same period the under-five mortality rate decreased from 216 to 75.) Furthermore, they were also trained to assist with deliveries. In their work they were supervised by a trained nurse. In

practice, local custom dictated that these young, unmarried caretakers were not allowed to assist with pregnancies. Older, experienced women, assisted women in labour. It was therefore considered more fruitful to train these so-called traditional birth attendants (TBA). At the end of their training the TBAs received a delivery kit from UNICEF. The training programme was supported by the World Health Organization (WHO) as well as UNICEF. In the beginning, only small numbers of women were trained to see whether they were as effective as expected. Around 1965, WHO agreed to train a hundred TBAs yearly in Irian Jaya. In the course of time, the work of the village caretakers became more integrated with the other health facilities and facilitators to increase the extent of health care. The traditional birth attendants for instance, instead of regarding village caretakers as competitors, were more willing to cooperate and even started to supervise these young girls in their tasks.

Since the time Irian Jaya officially came under the Indonesian rule, national health regulations also applied to this area. In the early 1970s, the Minister of Home Affairs of Indonesia initiated the Applied Family Welfare Programme (*PKK=Pembinaan Kesejahteraan Keluarga*), which aimed at sound national development in which married women were supposed to play a crucial role. Leaders of the *PKK* are usually the wives of government employees. At village level for instance, it is the *Ibu desa* (wife of the village leader), while on *kecamatan* level it is the *Ibu camat* (wife of the camat) who holds the post of *PKK* leader. These leaders are responsible for the programmes on family planning and family welfare. The *PKK* was set up to help women meet their obligations related to sound national development (e.g. as caretaker of household, as producer of future generations, and as the family's prime socializer) by embodying appropriate ideals, issuing information guidelines, and by training women in their application (Hunter, 1996, pp. 169-171). Hunter (1996, pp. 172-173) however argues that all this female effort is not going to yield progress for women or effect a change in status. She sees women as subordinates of their male counterparts. Although most parts of the *PKK* programme do not seem to work very well, the part concerned with Health and Family Planning is however functioning. The *posyandu*[4] is run by voluntary *kader* and nurses from the *puskesmas*[5] who visit each village for the monthly checks to monitor weight and for vaccination. The way *posyandu* consultations are organized is quite time-consuming for the women who attend them and shows little consideration for their daily work (in the house or in their gardens) (Hunter, 1996, p. 176). This surely holds for Teminabuan subdistrict as well. Especially when the *posyandu* is organized in a neighbouring village, about half of the women who attend have to walk there. It may be that on the set hour the *posyandu* is scheduled to start, the personnel has not arrived yet so the women may have to wait for hours. It has even happened that the personnel do not show up at all. Not showing up without notification is of

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4 *Posyandu* is the abbreviation of *pos pelayanan terpadu* (integrated village health service post). In a *posyandu*, five health services are provided on a monthly basis by community volunteers and a staff member of the *puskesmas*. It concerns the following health services: maternal and child health care, nutrition, immunization, diarrhoea disease control, and family planning. *KB* stands for *Keluarga Berencana* (family planning), indicating that family planning services are provided in such a health facility.

5 *Puskesmas* is the abbreviation of *pusat kesehatan masyarakat*, which means community health centre.

course understandable in the light of the poor communication facilities available, still there is no way of retrieving these lost working hours. Reproductive health does not receive the same attention as fertility control. Many women experience side-effects of modern contraception such as heavy bleeding and discomfort, which cause anxiety. Consultations at subclinic level regarding these matters are rarely satisfying (Hunter, 1996, p. 183). Papuan women in Teminabuan also expressed the feeling that in the communication between them and the mostly non-Papuan health centre staff, there was a cultural difference which was hard to bridge.

In 1984 there were 47 health centres and subcentres per 100,000 persons available in Irian Jaya (Hill & Weidemann, 1989, pp. 42-43), which is the highest ratio for the whole of Indonesia. This is a consequence of the dispersed settlement pattern of the population in Irian Jaya. Other extended areas with a low population density, like Central Kalimantan, also show high ratios. In the Teminabuan subdistrict 10 health facilities were found in 1991 (Pemerintah Kabupaten Daerah Tingkat II Sorong, 1992a, pp. 27-28), to wit: 1 *puskesmas*; 4 *puskesmas pembantu*[6]; 1 *BKIA*[7], and 4 *pos KB/yandu*. There is no hospital in Teminabuan subdistrict. In 1991, the number of health personnel in the area was: 3 doctors; 6 *mantri* (head nurses); 50 *perawat/bidan* (trained nurses and midwives), and 35 *dukun bayi* (traditional midwives). The trained personnel is very much concentrated in Teminabuan town (all doctors and trained nurses/midwives), where army personnel and civil servants are found (Pemerintah Kabupaten Daerah Tingkat II Sorong, 1992a, p. 28). In 1996 there was only one doctor.

In 1996, quite a number of villages or village groups (16 out of 27) in Teminabuan have a health facility. With an eye to the accessibility of the health services, neighbouring villages are grouped because it is easy for the population of these villages to make use of the health service present in their or the adjacent village. One should however keep in mind that although in many villages there may exist a *posyandu*, including a *puskesmas pembantu*, this does not automatically mean that medicine or health personnel are permanently present and on call. On paper the *puskesmas* in Teminabuan town has the following facilities: an outpatient clinic, dental clinic, delivery room, observation room, and laboratory service which can carry out checks for malaria and haemaglobin levels. At the time we visited the *puskesmas*, the dental clinic was so lacking in instruments that only tooth and molars extractions of could be carried out. The observation room can hold 8 persons for a maximum duration of a week, though no surgery is available. There is however the possibility of referral to Sorong (if transport is available and the family has enough money to pay for it). Blood smears can only be checked in the morning on sunny days because microscopic examination requires bright light. On Saturdays and Sundays, and afternoons, the *puskesmas* is closed. Medicine supplies to the *puskesmas* in Teminabuan is brought from Sorong every three months. The medicine intended for the *puskesmas pembantu* can then be collected by its health personnel. Usually, the last supplies of medicine run out some two months after their

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6 See note 5; subhealth centre.

7 *BKIA* stands for *Balai Kesehatan Ibu dan Anak*, meaning mother and child health centres. It is integrated in the *Puskesmas*.

arrival, before any new stock has arrived. When there is no medicine in the *puskesmas* the population can buy prescribed medicine from the pharmacy if it is in stock and affordable. Many people just take medication till the symptoms disappear, regardless of whether the course of treatment is finished, just to save money. This practice carries the risk of bacterial resistance to the medicine used and thus, the eventual ineffectiveness of the medicine. Unfortunately, this problem is not restricted to Teminabuan only but is common in many developing countries. In Sorong district a programme was carried out with the purpose of supplying every village with a trained birth attendant by the end of 1997. Teminabuan sent quite a number of women to this course to provide every village with a trained birth attendant. These women are trained in mother and child care as well as in general health issues, which also will become part of their task. Ideally, the recruited women should come from the village where they will be posted so as to ensure that such services are available to the villages. An illustrative example is seen in teachers who are very much inclined to spend too much time in their home village, instead of the villages to which they have been posted. There is a risk that, in time, these mainly unmarried women will marry and move to the village of their husband.

In Indonesia, the guidelines of the WHO are followed for the vaccination of children. The Extended Programme on Immunization (EPI programme) was introduced in Indonesia in 1977 and incorporates vaccination against the following diseases: tuberculosis (BCG), diphtheria, pertussis, tetanus (DPT), polio, and measles. The aim of the programme is to have children vaccinated before they reach one year of age. The EPI programme has put much effort in the recording of the vaccinations. Initially, vaccinations were only recorded in the registration books at the village level. Later on, health cards were used to record vaccinations as well as the antenatal visits and growth measurements. Registration books continued to be used as well (CBS *et al.*, 1995, p. 165; CBS *et al.*, 1992, p. 121). In Teminabuan it is however still common practice that the health cards are kept by the *posyandu* personnel. Vaccinations are regularly offered at the monthly *posyandu*. For polio a special programme was initiated in the 1990s for the period of a few years in order to boost the number of children vaccinated. This meant that in the months of October and November large vaccination campaigns were held all over the subdistrict.

The immunization of pregnant women is carried out by the EPI programme in cooperation with the Maternal and Child Health Care (MCH) programme. The aim of the programme is to give two tetanus toxoid injections to women during their first pregnancy and to administer one additional booster each time they become pregnant again. According to national regulations, antenatal cards which record the tetanus toxoid immunizations, are distributed to every pregnant woman (CBS *et al.*, 1995, p. 151). Though in Chapter 5 it is stated that some 40 per cent of the Teminabuan women received a tetanus vaccination during their last pregnancy, there was little mention of cards being handed out during an antenatal check-up.

3.4 Socio-economic conditions

From international research it is known that the level of education, especially of women, is a main determinant of child health. Besides, it defines the kind of economic activity which can

be carried out by a person or community. Literacy is a prerequisite for people to obtain information in newspapers and leaflets. Literacy also plays a role in the dissemination of information on health and other important topics, especially in an area where radio and television are still not within reach of many.

Access to good education is very limited in the villages. Although in Irian Jaya primary schools are plentiful and relatively accessible (for Teminabuan data see Sub-section 3.4.1), poverty prevents many children from attending more than a few years (see for reasons of drop-out Sub-section 3.5.7). Besides, limited employment opportunities for secondary school graduates gives poor families little incentive to invest in their children's education (cf. Grace, 1996, p. 148). Young indigenous people in Irian Jaya have difficulty gaining access to nursing, teaching, and other government jobs even if they have the necessary education. These jobs are difficult to acquire, because they usually require, besides qualification, large payments and/or good social connections (cf. Grace, 1996, p. 149).

3.4.1 Educational system and facilities

From the New Order of 1965 onwards, in Indonesia education is compulsory for children up to 12 years old. Since a few years ago compulsory education has been extended to include 3 years of secondary education. Partly because of differences in the distribution of schooling facilities all over Indonesia, school attendance levels are not yet at an optimum everywhere. In Teminabuan subdistrict the situation is as follows. Of all the 31 villages in Teminabuan subdistrict, four do not have a primary school. For this purpose the villages of Konda and Wamargege, and Manelek and Bariat share schools because they are located close together and schoolchildren can easily attend school even if it is located in the adjacent village instead of their own. Three of the four villages without a primary school are located in the hill area of the subdistrict. Secondary school facilities are only offered in Teminabuan town. Here we find two lower and two upper secondary schools. The lower secondary schools have a total capacity of 500 pupils, while the two upper secondary schools have a capacity of 150 pupils each (Pemerintah Kabupaten Daerah Tingkat II Sorong, 1992a, p. 26). The mean ratio of teachers to pupils at the primary schools in Teminabuan subdistrict was 1:19 in 1991 (Pemerintah Kabupaten Daerah Tingkat II Sorong, 1992a, p. 26). In the villages of Kaibus, Kohoin, Wersar, Wehali, Konda, Sawiat, Seremuk, Waigo, and Manggroholo there were 31 pupils or less per teacher at the primary schools. Exceptions were the villages of Pasir Putih (1:42) and Haha (1:68).

Most schools in Teminabuan subdistrict have been in operation since the 1950s or 1960s, though some schools have only recently been opened as is the case in the village of Welek, where the primary school opened in 1993. Children living in the *dusun* (garden) Kwowok, which is part of Manggroholo village, usually start going to school at a somewhat older age than six as they are still considered too young to walk every day to and fro for half an hour on muddy paths. Furthermore, starting school at six years of age is not as strictly adhered to as in the West.

In the Teminabuan survey a person is defined as illiterate if (s)he can not read and/or write a simple letter. It is striking that the 1991 and 1996 figures show more or less the same proportions of illiteracy in spite of the increased percentage of the population that attended or completed primary school. An explanation may be that quite a number of those who attended primary school, especially those who did not (yet) complete it, are not able to read and write sufficiently to be considered literate. As the Monografi Teminabuan takes 100 as the total percentage, this means that those people who did not yet attend school and those who did not (yet) complete primary school, notwithstanding the fact that most people in these two groups are illiterate, are not included in the category 'illiterate'. Applying the same definition to the 1991 data as has been used with the 1996 data would likely result in a substantially higher proportion illiterate for the year 1991.

Table 3.6 **Population of Teminabuan subdistrict by level of education, 1991 and 1996**

	Percentage of population	
Educational attainment	Teminabuan 1991	Teminabuan 1996[a]
Not yet attended school	8.7	4.3[b]
Not yet completed primary school	20.7	27.9
Primary school	12.9	16.1
Lower secondary school	5.1	7.0
Upper secondary school	3.3	4.1
Higher education	0.5	0.8
Illiterate	48.5	48.6 (n=6,234)
Total population	100.00 (n=11,925)	n=6,249

Sources: Pemerintah Kabupaten Daerah Tingkat II Sorong, 1992a, p. 21; Teminabuan survey 1996.

[a] The total percentages exceed 100.0 per cent as those in the categories 'not yet attended primary school' and 'not yet completed primary school' partly belong to the category 'illiterate'.

[b] Includes only the population 5-12 years of age, as it is likely that those who did not yet attend primary school by the age of 12 will ever attend primary school, and besides, children of age 0-4 obviously do not yet attend school.

Table 3.7 provides more details (by area, age group, and sex) of those who are illiterate. The Irian Jaya figures in Table 3.7 show a decline in the proportion of illiterate persons towards younger ages, meaning that schooling has over time become more and more available and used by the population. The reason why the lowest percentages of illiteracy are not found in the youngest age group in Teminabuan, might be because those in the youngest age category are still in primary school, some of whom are not able to read and write yet due to the generally low standard of education. Why Irian Jaya data does not show this pattern is however unclear, but might well be a matter of definition. Teminabuan as well as Irian Jaya data show that the percentage of illiterate women is overall distinctively higher compared to men.

Table 3.7 **Illiterate population 10 years of age and above by age group and sex; Teminabuan 1996 and Irian Jaya 1990 (in %)**

Age group	*Teminabuan*		*Irian Jaya*		*Indonesia*	
	Male	Female	Male	Female	Male	Female
10-14	33.7 (n=382)	34.5 (n=370)	10.7	13.1	N.a.	n.a.
15-19	14.4 (n=283)	11.2 (n=250)	11.7	21.3	n.a.	n.a.
25-29	12.0 (n=240)	27.1 (n=258)	13.7	30.7	n.a.	n.a.
35-39	19.1 (n=225)	30.8 (n=198)	22.1	40.3	n.a.	n.a.
45-49	29.7 (n=111)	48.1 (n=106)	28.9	44.8	n.a.	n.a.
50+	53.8 (n=342)	61.9 (n=305)	37.8	54.1	n.a.	n.a.

Sources: Teminabuan data: Teminabuan survey 1996; Irian Jaya data: *BPS*, 1992, p. 48.
n.a.= not available.

When comparing the proportions of illiterate people age 10 and above between Irian Jaya and Sorong district, which includes Teminabuan, it shows that the overall rate of illiteracy in Irian Jaya is 31.2 per cent, while for Sorong district it is much lower, at 14.1 per cent (*BPS*, 1992, p. 57; see Appendix 3.1, Table 7). One should however keep in mind that a relatively large part of the population of Sorong district (44.1%) lives in the urban areas. For the whole of Irian Jaya the urban area hosts 24.8 per cent of the population of this province (*BPS*, 1992, pp. 37-39). What is remarkable is that for the whole of Irian Jaya, the percentage of illiterates is about ten times as high in the rural area compared to the urban area. Already in the age group 25-29, more than 50 per cent of the women from the rural areas are illiterate. With regard to the proportion of illiterates, the rural part of Sorong district seems to be relatively better off compared to the rural areas of the whole of Irian Jaya (they show an illiteracy of 22.4 and 40.4%, respectively). For the urban as well as the rural area it can be observed that in all age categories women show higher illiteracy rates than men.

Media

To get people informed and/or to involve people in regional or national matters, it is important to know which types of media are frequently used. As to be expected, where illiteracy is high, like in Irian Jaya, the percentage of women reading a newspaper weekly is low (19.1% in Irian Jaya compared to 26.9% for the whole of Indonesia). Irian Jaya however stands out even more because of its low level of women watching television or listening to the radio every week. For Irian Jaya it is 21.8 and 23.6 per cent, while for Indonesia they are 60.8 and 62.7 per cent, respectively. In Teminabuan subdistrict no newspapers are sold and even in Sorong town newspapers are only sold in a handful of shops. Televisions and radios are scarce goods, partly because of the limited supply of electricity (which is restricted to Teminabuan town only).

3.4.2 Provincial economy

A short outline of the economy of Irian Jaya is presented as to enable us to form an idea of its impact on the research area, as well as to understand its state of development.

Initially, development programmes were mainly directed at economic growth with the reasoning that economic prosperity would automatically increase the people's welfare. Thus, the first development programme for Irian Jaya since the New Order (1969) aimed at rehabilitation and extension of infrastructure and means of communication, in order to stimulate private economic activities in agriculture and associated sectors. Subsistence agriculture was the predominant means of livelihood. Irian Jaya experienced a kind of brain drain when in 1963 and at the time of the 'Act of Free Choice' in 1969, the Dutch and trained local personnel left the country. Poor road and sea communications were seen as the major obstacles to the development of trade links and the growth of commercial farming. After 1969, government spending to stimulate the local economy grew rapidly. In the period 1971-1984 the annual growth of the Gross Domestic Product (GDP) was around 7 per cent in Irian Jaya, after which the rate of growth slowed down (Manning & Rhombic, 1989, p. 79). Over the period 1983-1992, the annual real growth of the Gross Regional Domestic Product (GRDP) per capita was estimated to be 1.7 per cent in Irian Jaya, which is below the Indonesian average of 2.5 per cent (Barrow, 1997, p. 4). Barlow (1997, pp. 4-5) provides information on the composition of the GDP of Irian Jaya (please refer to Table 8 of Appendix 3.1). Manning and Rumbiak (1989, p. 80) state that the proportion of the local population who benefited from the growth in the cash economy in Irian Jaya is relatively small compared to most Outer Island provinces and Papua New Guinea. The major stimulus for economic growth has come from the greatly expanded public budget and new economic opportunities ensuing from closer integration within the national economy. Export income however declined in the 1980s, as a consequence of reduced oil and timber production. Reduction in oil export was a result of both the oil crisis and the drying up of the wells. The sharp drop in oil revenues was only indirectly felt in Irian Jaya, as oil revenues largely went to the central government. This decline in oil revenues decreased the transmigration budget, the effect of which was mainly felt in the fields of construction employment and associated spending in urban areas. Hardwood logging has been used since the implementation of the New Order as a quick

source of revenue which requires only little capital investment. It was only in the early 1980s that the Indonesian government imposed a ban on the export of logs so as to promote local processing, to add value, as well as to achieve conservation objectives. As a result forestry output dropped. On the other hand, plywood export increased, and through to 1986 it accounted for about half of the country's total manufactured exports (Hill, 1994, pp. 210-211). In Irian Jaya, both hardwood logging and plywood production were still being carried out in 1996.

Next to oil, Irian Jaya produces substantial quantities of copper, gold, and fish. All these products, except food crops, are largely exported and are major sources of external revenue for those operators concerned (e.g. the central government; foreign and local contractors). As mentioned before, the impact of the oil and timber activities on the regional economic activities is small. Overall, the products are exported as raw materials and most revenues flow to the central government. Only in the Sorong region are employment and income generation quite strongly influenced by the new investments. Trade is important in Sorong. One-third of all trade activities within Irian Jaya take place in the Sorong region. The share of agriculture in the non-mining regional product has declined. To some extent this reflects the stagnation of traditional tree crop exports, which have increased little since the early 1970s. Food crop production in inland and highland areas continued to remain largely subsistence-oriented. New economic activities have mainly been concentrated in Jayapura and Sorong, which account for a large share of the urban population (55% in 1990 [*BPS*, 1992, p. 37]) and for about 30 per cent of the total population of the province (*BPS*, 1992, p. 39). Over half of the provincial value of manufacturing, construction, transport, and trade was recorded in Jayapura and Sorong, and around 70 per cent of these sectors and government administration was recorded in the north coast area in 1984 (Hill & Weidemann, 1989, p. 9).

The government investments have benefited selected areas, resulting in an uneven income distribution in Irian Jaya. The regions that profited most are the more accessible and more nationally integrated northern *kabupaten*, and within these districts, the urban areas and the inmigrants (see Section 6.2 for the definition of inmigrant) (Manning & Rumbiak, 1989). Barlow (1997, p. 14) describes the urban rich and the rural poor in Irian Jaya as follows. He identified high income enclaves around administrative and commercial centres including Jayapura, Merauke, and Sorong. Barlow goes on to say that these and other enclaves in Irian Jaya are characterised by relatively high income populations living amongst a sea of isolated mainly subsistence farmers.

Since 1979 a large part of the development budget has gone to education, mainly to the primary school building programme. By the mid-1980s, enrolment ratios for the primary and lower and upper secondary schools probably increased to around 80, 50 and 20 per cent, respectively, of the relevant age group populations, largely due to an expansion in school building programmes. Figures on enrolment rates for Irian Jaya in 1990, as presented in Table 3.17, give the impression that the rates have continued to go up over time. Mission schools accounted for over half of primary and lower secondary enrolments and about one-third of upper secondary enrolments in the early 1980s, but the relative importance of totally government funded and administered institutions has increased considerably.

The third major area of government spending was agriculture. A considerable amount of the budget has gone to supporting transmigration projects. Arable land needed to be identified, cleared, and prepared for the influx of transmigrants, who were for some time supported in their agricultural activities. Expenditure in other sectors outside transmigration can broadly be divided into two categories: development of urban facilities and rural development programmes.

Urban economy in Irian Jaya

Urban population growth has been high in Irian Jaya from about 1970 onwards. Increased sea and air communication links, rapid growth in the urban labour demand, relatively high wages and incomes have encouraged the influx of migrant labour, mainly from South Sulawesi, Java, and the Moluccas. Weak rural-urban linkages and the limited experience and skills of the indigenous population are the major obstacles which prevent participation in the urban economies. As a result, half of the growth of the urban population in the intercensal period consisted of migrants. Besides, contractors regard immigrant labourers as more reliable and harder working and therefore prefer to employ them instead of the local people. What further favours the immigrants is their close-knit organization, which facilitates extension of marketing links and distribution of capital from the larger traders to newcomers. This altogether makes entry in market trade extremely difficult for the less experienced locals. Koentjaraningrat (cited by Manning & Rumbiak, 1989, p. 91) suggests that more effort should be made to train the local people in semi-skilled and skilled jobs in urban areas, although he accepts the fact that trade and skilled labour will continue to be dominated by immigrant labour in the near future. Unskilled labour within the civil service has been the main source of wage income for the local Papuans since the Dutch have left.

One can conclude that the limited employment opportunities for unskilled labour in the towns, reinforced by the weak linkages between the urban centres and the rural areas, restrict the cash remittances to villages and therefore rural development as well as the possibilities for cash cropping, a situation contrary to PNG. Secondly, although levels of education have risen, the possibilities for local people to participate in suitable jobs in the urban economies have not (Manning & Rumbiak, 1989, p. 92).

Industries in Irian Jaya

In Irian Jaya, Sorong has been the centre of resource-based investment and exports. All oil exploitation and foreign investments in prawn fishing have been concentrated in this region, which accounted for well over 90 per cent of Sorong's exports in the mid-1980s. Oil exploration in the region contributed to significant employment creation from the mid-1970s to the early 1980s, providing short-term contract work for several thousand workers at various times. Growth in employment is however not likely. There have been few new investments in fisheries and associated processing activities, while at the same time oil exploration has declined. This led to problems of unemployment among the youth in Sorong in the mid-1980s. Despite considerable explorations for oil and other minerals, low world prices of most minerals, high operating costs, and security threats in some areas have been the major factors discouraging new investment. More than ten years later, the situation seems to have changed.

The index of employment growth for the Moluccas and Irian Jaya together is as high as 265 (Indonesia=100) over the period 1987-94. For the non-agricultural sector the index is 170 for the Moluccas and Irian Jaya. Still, one has to consider that if the starting level is low, high growth indexes are only a relative measure. For instance, the index of employment growth in manufacturing for the Moluccas and Irian Jaya together is 430, the highest index in Indonesia. Its percentage of the total employment is however the lowest in the whole of Indonesia, that is one per cent (Manning, 1997, p. 30).

Rural development in Irian Jaya
Production in most rural areas in Irian Jaya continues to be largely subsistence-oriented. In 1980, only 15 per cent of the rural workforce was involved in non-agricultural employment as a primary activity, as little as half of that found in most other Outer Island provinces (Manning, 1997, p. 31). In 1992, this proportion has grown to 27 per cent (Barlow, 1997, p. 6). Thus, agriculture is still the main source of income in Irian Jaya (Mboi, 1997, p. 135). According to Mboi the agrarian sector is incapable of becoming an instrument to improve of the welfare of the people of Eastern Indonesia because of its lack of efficiency.

Since 1985 the provincial government of Irian Jaya has tried to develop a rural community development model for the province. Besides, the standard of living in the rural areas is addressed via special programmes, such as *IDT* (*Inpres Desa Tertinggal*, or the presidential instruction on poor villages). Moreover, villages routinely receive governmental funds which are meant for village programme activities. So far, results from these programmes have been limited. Marlessy (1997, p. 247) ascribes these programme failures mainly to their method of organization. Marlessy states that the programmes are nationally designed and lack cultural and ecological relevance to the province. The local population is not involved in the planning of the programmes. The development programmes are sectoral (e.g. agriculture), which limits its profitability. Within these programmes, the *desa* is usually taken as the area of attention, though in Irian Jaya a *desa* is more an administrative unit than a cultural one (NB the high mobility rate mentioned in Chapter 6; see also Chapter 2 on data collection). Marlessy also contends that investment in local human resources is usually overlooked.

3.4.3 Economic activities

In the rural areas of Irian Jaya in 1980, 85.4 per cent of the labour force were engaged in agriculture, 8.5 per cent in 'all other services', and the remaining 6.1 per cent in mining, manufacturing, utilities, construction and transport (M) . For the entire province of Irian Jaya, 74.9 per cent of the labour force find employment in agriculture compared to 56.3 per cent for Indonesia (Hill and Weidemann, 1989, pp. 14-15). In the urban areas in Irian, the majority of the labour force works in the category 'all other services' (60%), 21.8 per cent is engaged in M, while 18.1 per cent is employed in agriculture.

What we see in Table 3.8 is that working life in the rural area starts at an earlier age and ends at a later age for both men and women as compared to the urban area. Besides, the percentage of economically active women in the rural area is much higher than in the urban area.

Although oil and copper mining are very important industries in Irian Jaya, only relatively few indigenous people earn their living from these industries. For the rural population like in Teminabuan subdistrict, income-generating activities are still very much the same as they were decades ago. Most jobs which require education, such as the local administration, health services, and trade business, are mainly held by immigrants from other islands. In the following subsections we describe for the research area (a) sources of household income, (b)agriculture, as it is the most predominant means of livelihood in Teminabuan subdistrict, and (c) the possession of durable goods and cattle as an indicator of a household's socio-economic status.

Table 3.8 **Percentage of working age population 10 years and above who are economically active, by place of residence (urban/rural), age group, and sex, Irian Jaya, 1990**

	Urban		*Rural*		
Age group	Male	Female	Male	Female	Total
10-14	2.64	1.62	15.31	14.95	12.18
15-19	18.09	14.82	51.32	48.62	39.78
20-24	65.47	34.05	87.94	66.66	67.78
25-29	89.96	36.74	97.64	70.63	78.22
30-34	96.21	33.70	99.13	71.13	80.96
35-39	97.09	38.52	99.14	75.57	84.09
40-44	98.07	36.88	98.64	75.81	84.76
45-49	93.96	35.05	98.21	75.82	84.42
50-54	86.16	31.40	95.37	57.99	75.41
55-59	73.33	20.52	89.39	55.31	69.30
60-64	42.69	16.26	77.74	38.40	53.65
65+	32.63	12.57	61.20	23.42	40.05
Total	62.04	26.10	74.02	57.93	60.95

Source: *BPS*, 1992, pp. 91-99.

A. Source of income

Many households have more than one source of income. For example, quite a number of households (60.8%; n=738) have, regardless of their main source of income (except farming), a plot of land as a supplementary source of guaranteed and cheap income. Others sell part of their crop from their garden or sago field, or part of the fish they catch. Fishing is the most frequently mentioned secondary source of income (67.6%; n=1,368). Farming is the most important main source of income and the second most important secondary source of income. The third, fourth, and fifth major secondary sources of income are: beating sago (57.1%; n=1,113), hunting (54.0%; n=1,399), and selling of crops (51.8%; n=1,400).

With reference to Table 3.9, the survey data show that of those households for whom farming is the main source of income, 54.5 per cent (n=662) sells part of their harvest. Of the households who mainly live from beating sago, for as much as 73.9 per cent (n=287) the sale of sago constitutes a secondary source of income. Fifty per cent (n=32) of the households who catch fish for their the main source of income, work in a garden as well. Of the households living from a regular income (civil servants) a large percentage (60.2; n=232) have a garden as their secondary source of income. Traders clearly show a different pattern in secondary source of income; 15.9 per cent (n=44) of these households have a motorcycle as supplementary source of income (kind of public transport). Traders are usually people from Sulawesi, who have no access to land. They therefore have to find (secondary) ways of earning a living which do not involve farming.

Table 3.9 **Percentage distribution of the main sources of income by household in Teminabuan subdistrict, 1996**

Main source of income	Percentage of households
Farming	48.3
Beating sago	20.9
Government job	16.9
Trade	3.2
Fishing	2.3
Pension	1.1
Retail	1.0
Hunting	0.1
Other	6.3
Total	100.0 (n=1,373)

Source: Teminabuan survey 1996.

B. Agriculture

From the 1996 Teminabuan survey as well as from the Monografi Teminabuan (Pemerintah Kabupaten Daerah Tingkat II Sorong, 1992a, p. 22) it is clear that only a few activities dominate economic life in Teminabuan subdistrict. As the population predominantly relies on agriculture for their livelihood, the majority of the working population are farmers and/or fishermen. Shifting cultivation and subsistence agriculture are prevalent in Teminabuan subdistrict. The rotation period in shifting cultivation is less than two years in this area. For their own consumption the people of Teminabuan district grow cassava, sweet potato, taro, peanuts, green peas, maize, and vegetables. These crops are hardly sold; only if the harvest exceeds a household's needs will the surplus be sold on the local market. However quantities are small. For trading purposes the following are cultivated in Teminabuan subdistrict: cacoa, coconut, and coffee. Cash crop cultivation is however still very limited and small scale. Fishing for local consumption is found in the coastal villages. No fishing takes place in the northern part of the subdistrict, which is afforested area (Pemerintah Kabupaten Daerah Tingkat II Sorong, 1992a/b). Forestry is something which is developing in the villages of Keyen and Waigo; the trunks are transported by river to Teminabuan town, where they are sawn and sold. Planks also are made and sold shipped to Ujung Pandang. Wood is also shipped to Ambon.

In Teminabuan subdistrict most gardens are located outside the villages and this can be at quite a distance. Of the 1,143 households, 14 hardly need to travel to reach their garden whereas 830 can reach their garden within one hour. The majority of people go on foot (92.0%; n=1,116), 6.9 per cent take a boat, and 1.1 per cent go by motorbike (public transport). The time required to reach a sago field is significantly longer. Of all the 977 households, 298 (30.5%) travel up to one hour, 369 (37.8%) travel for one to two hours, and 198 (20.3%) travel between two to three hours. A small number, 43 (4.2%) have to travel for more than 8 hours. Again, most people travel on foot (86.4%), though a boat is more often used (by 13.3%) than when going to the garden. A tiny percentage (0.2%) even cross the sea in a big boat. In most cases (94.0%; n=977) households own a sago field as well as a garden. Of the households who own a garden, 80.1 per cent have a sago field. The reason why sago fields are on average located at a greater distance from the village than gardens is that their location is more or less fixed. Sago palms take about 30 years to mature, and offshoots will grow close to the old one. Families therefore go to the same spot to collect sago for decades on end. Gardens, on the other hand, are only temporarily used at the most for a period of about two years, which makes frequent travelling necessary. If the distance to the gardens becomes too inconvenient for all villagers, they can even decide to move the whole village. Nowadays the government is however restricting this practice. Regardless of the nature of the main source of income a household has, 26.9 per cent (n=1,400) of the breadwinners do not return home every night from their income-generating activities. Households with gardening as their main source of income do not return home daily in 29.3 per cent (n=662) of cases. As to be expected with regard to the longer travelling time involved, 54.9 per cent (n=286) of households for whom beating sago is the main source of income, do not return home daily. Of those who do not return home every night, 58.4 per cent (n=375) return home every few days, 39.5 per cent once a week, and 2.1 per cent less frequently. With regard to the continuation of schooling we asked respondents to specify those who stayed outside the village. In 56.8 per cent (n=368) of the households who spent the night outside the village,

it involves all family members, thus including schoolchildren as well. In 21.5 per cent of households, all family members stay away, except for the schoolchildren. In 17.1 per cent it is just the parents who go, while in the remaining cases it is either the mother or the father who stays outside. This means that of all the households interviewed, 14.9 per cent stay away from their village for some time with all the family members, resulting in a repeated interruption of their children's education.

C. Possession of durable goods and cattle

The possession of durable goods in the household such as a radio, television, bed, and table and chairs, as well as cattle can be used as an indicator of the household's socio-economic status (see Table 3.10).

Table 3.10 **Percentage distribution of durable goods in households, Teminabuan 1996; n=1,400**

Type of durable good	Percentage of households
Radio/cassette/tape	29.0
High pressure lamp	22.9
Brazier	19.9
Television	14.4
Bed	47.4
Cupboard/wardrobe	35.4
Table and chairs	67.0
Mattresses	28.4
Mean number of articles owned	2.6

Source: Teminabuan survey 1996.

It is not hard to imagine that families with a cash income, such as civil servants and traders are the ones who posses most durable goods. The goods are therefore mainly concentrated in Teminabuan town and some of the adjacent villages. In spite of a mean number of articles of 2.6 per household, 24.3 per cent (n=1,397) of the households do not have any of the durable goods specified in the survey.

Teminabuan subdistrict is an area with a lot of waterways. Obviously these waterways constitute transport routes for those living close to them. Actually, 39.9 per cent (n=1,397) of the households have a boat. Most of these households (80.5%; n= 558) own just one boat (no motor), 14.3 per cent own two boats with no motor, and a small percentage of 2.5 have three boats (no motor). Of the households with a boat, 2.3 per cent have one motorboat, while

a tiny fraction (0.4%) own two motorboats. The models of the boats vary, thought the common type is a hollowed-out tree trunk. This is the most simple model and is used with oars. This basic model can be expanded with side supports on one or both sides. Even more sophisticated is a bamboo construction on top of the boat, by which it becomes a houseboat. An outboard motor can be attached to any of these kinds of boats.

Of the households interviewed, 48.2 per cent (n=1,399) have one or more animals. The kind and mean number owned are indicated in Table 3.11. The most commonly reared animal is chickens. Cattle breeding is therefore negligible.

Table 3.11 **Percentage distribution of cattle in households, Teminabuan 1996; n=1,399**

Animal	Percentage of households	Mean number of animals
Chicken	41.6	6.3
Pig	6.7	1.2
Goat	3.0	3.9
Fish	0.3	n.a.[a]
Cow	0.1	3.0
Other cattle	1.5	n.a.[a]

Source: Teminabuan survey 1996.
[a] n.a. = not applicable.

There is a good reason to keep chickens if people wish to keep cattle. Chickens will scratch their food from the ground, and therefore need little investment except for the purchase price. In addition, chickens provide eggs and meat for special occasions. Though sold on the market these are expensive.

3.5 Population characteristics

This section describes some general characteristics of the survey population, sometimes in comparison with data on Irian Jaya and Indonesia. The population number, its distribution by age and by sex, household composition, level of education, reasons for leaving school, marriage customs, marital status by age, ethnicity, religion, and daily language used, are all items that will be discussed. To improve comparability, the subjects and the corresponding order follow the DHS reports as far as possible. Taken together with Sections 3.2, 3.3 and 3.4, this section provides an outline of the population under study, its characteristics, and its potential.

3.5.1 Total population

In 1990, the total Indonesian population was almost 180 million (United Nations, 1995), of which the population of Irian Jaya is only a tiny fraction, approximately 0.9 per cent (1,630,107; *BPS*, 1992, p. 2). The population of the Teminabuan subdistrict totalled 11,925 in 1991 (Pemerintah Kabupaten Daerah Tingkat II Sorong, 1992a), while in October 1993 it numbered 13,302 (*Kantor Bupati* Sorong, 1993). The population density in this area is therefore 4.7 persons per square kilometre in 1991 and 5.2 in 1993.

The population figures for all the selected survey villages are presented in Table 3.12, based on the 1996 survey and the 1993 local enumeration (*Kantor Bupati* Sorong, 1993).

The figures presented in Table 3.12 indicate a normal value for the male/female ratio. Historical data sometimes indicate a shortage of women in some places, resulting in a higher male/female ratio. This might however have been due to small population numbers. With regard to the individual survey villages, a wide variation in the ratio was observed, from as low as 89.6 to as high as 117.2. The mean number of household members does not vary much (overall mean of 4.4 persons). As has already been mentioned in Sub-section 3.2.1, most of the villages show a drop in population size from 1993 to 1996. Besides actual population fluctuations, a likely explanation is that the local register still includes persons who have long moved away, a phenomenon which is related to land rights. In the 1996 survey, these people are excluded.

3.5.2 Population by age and sex

It should constantly be kept in mind that the population distribution for Teminabuan may deviate especially at higher ages where numbers are small. This might (partly) be a result of the relatively small sample size. Nevertheless, Teminabuan subdistrict shows a pattern of age distribution typical for an area with a high fertility. Roughly speaking, that means many young people and fewer old people: the younger the age group, the bigger the number (see Table 3.13; see also the population pyramid in Figure 3.3). For Indonesia we can see that the base is narrowing at this moment, indicating a fertility decline in the recent past (CBS *et al.*, 1995, p. 9). As the two youngest age groups of the Irian Jaya population are more or less of the same size, this might indicate that the population growth is at least slowing down a bit. For Teminabuan the age groups 25-29 and 30-34, and for Irian Jaya the age group 25-29 show an increased value compared to the preceding age group. Looking at Teminabuan data, the age groups 15-19 and 20-24 are relatively small compared to Indonesian data. A reason for the pattern found in Teminabuan might be that some of those aged 15-24 live elsewhere, for instance in Sorong town, Manokwari, or Jayapura, because of education or work, and return home when their education is completed or the job has ended. We therefore see their presence in the age group 25-34.

With regard to the population distribution by age, some deviations are found in the overall pattern of 'small numbers at the top, which gradually increase towards the bottom of the

Table 3.12 **Sex, number of households, and total population of selected villages of Teminabuan subdistrict, 1996 and 1993 (M=males; F=females; hhs=households)**

Village	M[a]	F[a]	M/F ratio[a]	Total no. of hhs[b]	Mean no. of persons per hh[c]	Total survey population 1996[b]	Total population 1993[g]
Welek	86	90	95.5	39	4.7	188[d]	218
Pasir Putih	128	114	112.2	63	4.1	258[e]	389
Kofalit	66	63	104.7	30	4.6	138[e]	186
Sasnek	117	130	90.0	55	4.4	247[d]	520
Sawiat	138	154	89.6	86	4.1	358[e]	519
Eles	104	103	100.9	55	3.9	214[e]	229
Bariat	82	76	107.8	37	4.6	166[d]	218
Menelek	91	94	96.8	55	4.8	255[d]	415
Konda	153	140	109.2	85	4.8	398[d]	367
Wamargege	74	64	115.6	79	5.1	374[d]	433
Waigo	190	162	117.2	125	3.2	411[e]	452
Sungguer	101	100	101.0	63	4.2	255[d]	199
Seribau	170	164	103.6	94	5.0	446[d]	572
Mlaswat	87	89	97.7	45	4.6	210[d]	358
Manggroholo	181	184	98.3	87	4.3	386[d]	341
Sayal	139	149	93.2	75	4.2	332[d]	353
Haha	90	87	103.4	48	4.1	191[d]	257
Wermit	308	299	103.0	167	4.3	729[e]	548
Kaibus	503	479	105.0	383	4.7	1,834[e,f]	1,549
Kohoin	352	349	100.8	260	4.9	1,283[e,f]	1,983
Total	3,160	3,090	102.2	1,931	4.4	8,673	10,106

Sources: Survey Teminabuan 1996; *Kantor Bupati* Sorong, 1993.

[a] Teminabuan survey data 1996: numbers taken from the households interviewed.

[b] Teminabuan survey data 1996: total number of households, including the ones not interviewed.

[c] Based on the numbers actually interviewed.

[d] Based on the households interviewed, including the household (member)s absent at the time of the survey.

[e] Esimated on basis of the percentage of households included in the survey.

[f] For the village of Kaibus, 55.8 per cent of the houses were included in the survey; this percentage is 54 for the village of Kohoin.

[g] 1993 local enumeration data.

Table 3.13 **Percentage distribution of the *de jure* household population by age group and sex, for Teminabuan 1996 (n=6,198: males 3,130, females 3,068), Irian Jaya 1990, and Indonesia 1994**

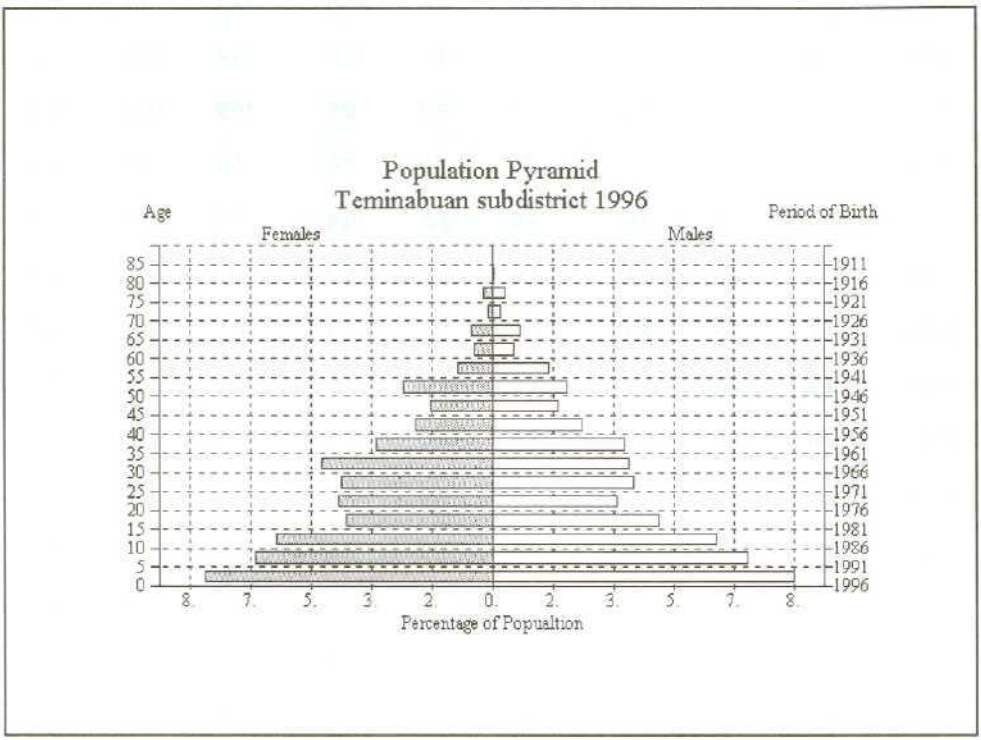
Age group	*Teminabuan*			*Irian Jaya*			*Indonesia*		
	M [a]	F [a]	T [a]	M	F	T	M	F	T
0-4	16.5	15.9	16.2	15.8	16.0	15.9	11.1	10.4	10.7
5-9	13.9	13.2	13.5	16.0	15.2	15.6	12.1	11.2	11.6
10-14	12.2	12.1	12.1	12.2	11.0	11.6	13.4	12.0	12.7
15-19	9.0	8.1	8.6	9.7	9.2	9.5	10.2	10.2	10.2
20-24	6.8	8.6	7.7	7.8	9.5	8.6	7.8	8.7	8.3
25-29	7.7	8.4	8.0	9.5	11.5	10.4	7.5	8.4	7.9
30-34	7.4	9.5	8.4	7.9	8.2	8.0	7.5	7.9	7.7
35-39	7.2	6.5	6.8	6.9	7.1	7.0	6.7	6.7	6.7
40-44	4.8	4.3	4.5	4.9	4.2	4.6	5.7	5.0	5.4
45-49	3.6	3.5	3.5	3.6	3.1	3.3	3.9	4.1	4.0
50-54	4.1	5.0	4.5	2.4	2.0	2.2	4.0	4.3	4.2
55-59	3.0	2.0	2.5	1.5	1.2	1.4	2.9	3.2	3.0
60-64	1.2	1.0	1.1	0.9	0.9	0.9	2.8	3.0	2.9
65-69	1.5	1.2	1.4	0.5	0.4	0.5	1.7	2.0	1.9
70-74	0.4	0.3	0.4	0.2	0.2	0.2	1.6	1.4	1.5
75+	0.8	0.5	0.6	0.2	0.2	0.2	1.1	1.4	1.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Sources: Teminabuan survey 1996; *BPS*, 1992, p. 3; CBS *et al.*, 1995, p. 10.

[a] M=males; F=females; T=total population.

population pyramid'. Higher numbers in the pattern just described are displayed by those whose age was 26-30, 33 and 34, 36, 46, 54, 66, and 69 years at the time of the survey. However, especially at higher ages, we are dealing with fairly small numbers, which in themselves are more prone to fluctuations due to sheer chance. Still, there are some clear explanations for the variations found. At the start of this subsection some explanatory remarks have already been given for the age group 26-30. In addition, elevated numbers at these ages might be a consequence of

Figure 3.3 **Population pyramid of the Teminabuan survey population 1996**



Source: Teminabuan survey 1996.

the fact that the local administration as well as the health personnel for a substantial part comprised newly recruited young people from other islands. Elevated numbers among those born between 1960 and 1962 are, at least to some extent, due to the historical calendar used for age estimation. 1962 marks the important local event *turun payung di Wersar* (dropping of Indonesian parachutists at Wersar[8]), which, because of its importance and its relatively

[8] The Dutch were forced to leave Irian Jaya by international and Indonesian forces. A fact locally remembered as *'turun payung di Wersar'*.

recentness, is often used as a reference when age needed to be estimated. When age estimation has not been or could not be carried out with sufficient accuracy, a slight concentration of number may result. This latter remark also accounts for those people born in the period 1950-1953, who probably related their year of birth to the 1953 event of *pembakaran kain timur* (burning of woven cloth used as bride price). Clearly it is difficult for people to remember how old they exactly were at the time the event took place, an event which they witnessed or heard their parents talk about. A substantial increase in number is perceptible among the people aged 54, that is, those who are born in 1942. Without much doubt this can be ascribed to the time of the Japanese war (1942) and the Second World War. If people mentioned that they were born during the Second World War, the year of birth was estimated to be 1942. The Second World War has however been used much less as a time reference than the Japanese war, which made more impact on the people of Irian Jaya. A small bulge in the number of people born in 1930 and 1927 probably refers to the period the Holy Word reached the Teminabuan area. To use the words of the local population: *dulu dunia kami gelap, sejak injil masuk dunia jadi terang* (in the past our world was dark, since the Holy Word our world became bright). That the (somewhat) elevated numbers are often numbers ending in a six, points to the people's preference to give a year of birth ending in a zero.

Due to the recent fertility decline in Indonesia, the percentage of population below 15 years of age has somewhat decreased (see Table 3.14). This pattern becomes even clearer when looking at data which goes back to 1980 (cf. CBS *et al.*, 1995, p. 11). Comparatively, Teminabuan still shows a more traditional pattern. The dependency ratio is calculated as the ratio of nonproductive persons (under 15 and 65 and above) to persons 15-64.

Table 3.14 **Percentage distribution of the population by broad age groups and its dependency ratio: Teminabuan 1996, Irian Jaya 1990, and Indonesia 1991 and 1994**

Age group	Teminabuan 1996	Irian Jaya 1990	Indonesia 1991	Indonesia 1994
< 15	41.8	43.1	36.2	35.0
15-64	55.8	56.0	59.9	60.4
65+	2.4	0.9	3.9	4.6
Total	100.0	100.0	100.0	100.0
Depen-dency ratio	79.2	78.5	67.2	65.8

Sources: Teminabuan survey 1996; *BPS*, 1992, p. 3; CBS *et al.*, 1995, p. 11.

3.5.3 Household composition

From Table 3.15 it can be concluded that the household composition of Teminabuan and Indonesia are quite similar. Indonesia shows a more pronounced peak in the 'number of usual household members' compared to Teminabuan. Female-headed households, which are regarded as a less favourable starting point economically as well as socially, are less prevalent in Teminabuan subdistrict. The percentage of the households with foster children below age 15 is slightly higher in Teminabuan.

Table 3.15 **Percentage distribution of households by sex of head of household, household size, and percentage of households with foster children, Teminabuan 1996 and Indonesia 1994**

Characteristic	Teminabuan	Indonesia
Head of household		
Male	91.9	87.2
Female	8.1	12.8
Total	100.0 (n=1,402)	100.0
Number of usual hh members		
1	7.0	5.5
2	11.0	10.3
3	17.7	18.1
4	17.8	21.3
5	17.4	18.0
6	13.0	11.7
7	7.9	7.0
8	4.2	4.0
9+	4.0	4.0
Total	100.0 (n=1,399)	100.0
Mean size	4.4	4.5
Percentage with foster children[a]	7.3 (n=1,358)	6.6

Sources: Teminabuan survey 1996; CBS *et al.*, 1995, p. 12.

[a] In the Indonesian data this includes households with one or more children under age 15 who are living with neither their natural father nor their natural mother. In the Teminabuan survey children are considered foster children when they are not living with their natural mother and born after 31/12/1980.

3.5.4 Educational level of household population

The educational level of the household population greatly differs according to province and demographic characteristics such as age and sex. For the Teminabuan subdistrict, the province of Irian Jaya, and the whole of Indonesia, the level of education can be read from Table 3.16. Overall, the median duration of education in Indonesia is 7.0 years for men, and 4.8 years for women. Compared with the figures for the whole of Indonesia, various eastern provinces of Indonesia stand out because of their low level of education. In Irian Jaya, men have a median duration of education of 5.2 years; women 3.9 years (CBS *et al.*, 1995, pp. 17-18). Among the 5 to 14 years of age, there is little difference in level of education between the sexes. In the past, it was not considered worthwhile investing in education for women as they would become mother and wife anyway. Higher-educated women would fetch a higher bride price, and it was therefore considered even more difficult to find a suitable husband for an educated girl. Nowadays, things are changing, though of course at a very slow pace in rural areas such as Teminabuan. More and more women work for some time after having completed their education, and of course the number of educated potential bridegrooms has increased as well. Men have started to work for several years before getting married. Holding a job, they can earn money to pay the bride price, which thus relieves the burden of their parents. For the traditional bride price items such as *kain timur*, the groom however remains dependent on the assistance of his parents (and relatives) (personal communication with D. Van Oosterhout, 1998).

Table 3.16 **Educational level of the household population: Teminabuan, Irian Jaya and Indonesia. Percentage distribution of *de jure* household populations aged five[a] and over by the highest level of education attended, Teminabuan 1996, Irian Jaya and Indonesia 1994**

	Males			*Females*		
Level of education	Temi-nabuan	Irian Jaya	Indo-nesia	Temi-nabuan	Irian Jaya	Indo-nesia
None	16.1	21.5	11.7	18.1	29.4	21.4
Some primary	32.4	34.9	37.7	36.9	34.7	36.3
Completed primary	18.1	8.4	19.6	21.9	9.9	18.3
Some secondary+	33.1	34.8	30.9	23.0	25.6	23.8
Missing/do not know	0.3	0.4	0.1	0.1	0.4	0.2
Total	100.0 n=2,540	100.0 n=634	100.0	100.0 n=2,514	100.0 n=568	100.0

Sources: Teminabuan survey 1996; CBS *et al.*, 1995, pp. 17-18.

[a] For Teminabuan data: household population aged six and over.

No firm conclusion can be drawn by just comparing the percentages given in Table 3.16 as the figures are not standardized for age. It is however remarkable that Irian Jaya has a relatively high percentage of the population regardless of sex without any education at all. On the other hand, Irian Jaya data shows a relatively low percentage of people that have completed primary school. Considering the percentage given for the categories 'some primary' and 'some secondary+', that is, some secondary education or more, these Irian Jaya data do seem somewhat unlikely.

3.5.5 School enrolment

School enrolment as a proportion of the age group 7 to 19 year is 76.6 per cent in Irian Jaya in 1971 (data derived from urban areas only). In 1980, school enrolment in Irian Jaya is 57.9 per cent for a slightly different age group, to wit 7-18 (urban and rural areas). In 1980, the figure for Irian Jaya and West Kalimantan is the lowest for the whole of Indonesia. The highest figure for 1980 is found in the province of Yogyakarta, where school enrolment among the age group 7-18 is 80.3 per cent (Hill & Weidemann, 1989, pp. 42-43). According to the 1994 Indonesian Demographic and Health Survey (CBS *et al.*, 1995, p. 19), the percentage of Indonesian youths between 7-15 years of age enrolled in school is some 10 per cent lower in the rural areas than in the urban areas. In Irian Jaya, the difference by residential area in the age group 7-12 years is even more pronounced (see Table 3.17). We see that, especially at higher ages, fewer women than men go to school in Irian Jaya (*BPS*, 1992, pp. 58-59).

Table 3.17 **Percentage of population 5 years of age and above attending school by age group, sex, and area, Irian Jaya, 1990**

	Urban		*Rural*	
Age group	Male	Female	Male	Female
5-6	38.37	38.94	17.90	19.27
7-12	93.78	94.65	80.30	77.53
13-15	93.93	88.09	76.34	71.75
16-18	77.62	72.26	50.22	32.09
19-24	31.33	17.37	12.67	4.64
25+	2.17	0.92	0.52	0.34
Total	37.42	34.93	30.01	24.05

Source: *BPS*, 1992, pp. 58-59.

In spite of the figures presented in the last row of Table 3.18 it is hard to believe that Teminabuan subdistrict is better of than the whole of Indonesia although there are of course provinces where the educational facilities are worse than in Teminabuan subdistrict. Furthermore, the percentages attending school are improbably high for the age group 16-18 in Teminabuan. However, this might be a result of the not uncommon phenomenon in Teminabuan that children, irrespective of the legal school age of six, start going to school at a later age. Therefore, some will still attend lower high school at age 16-18.

Table 3.18 **Percentage of population 5 years of age and above[a] attending school by age group and sex; Teminabuan 1996, Irian Jaya 1990, and Indonesia 1994**

	Teminabuan		*Irian Jaya*		*Indonesia*	
Age group	Male	Female	Male	Female	Male	Female
5-6	42.0 (n=88)	50.7 (n=67)	21.8	23.2	36.7	41.7
7-12	81.9 (n=470)	87.6 (n=461)	83.0	81.1	91.2	91.7
13-15	91.7 (n=217)	86.0 (n=215)	80.7	76.1	67.9	62.6
16-18	70.7 (n=167)	64.8 (n=145)	59.4	43.9	39.6	32.9
19-24	20.7 (n=261)	14.6 (n=308)	19.6	8.2	13.3	8.6
7-15	85.0 (n=687)	87.1 (n=676)	82.4	79.8	83.9	82.2

Sources: Teminabuan survey 1996; *BPS*, 1992, pp. 58-59; CBS *et al.*, 1995, p. 19.
[a] Teminabuan data: household population aged six years and above.

The percentage of males and females attending school in the rural areas always lags behind that of the urban areas. The urban area shows a steep decline in attendance rate after 18 years of age; this happens already after 15 years of age in the rural areas, and most predominantly among women. However, the Teminabuan results presented in Table 3.18 show that the sharpest decline takes place after age 18. One argument might be that the data were recorded six years apart and that there were changes implemented which extended compulsory education.

3.5.6 Educational level of ever-married women

Though not standardized for age, Table 3.19 displays once more the somewhat deviating pattern of the Irian Jaya data. The data differ from the Teminabuan and Indonesia data in the sense that there is a relatively high proportion in the category of ever-married women who have never been to school. Besides, the category 'completed primary' comprises a relatively low percentage as was the case in Table 3.16, which is rather remarkable considering the fact that the proportion of women in the category 'some secondary' is highest for Irian Jaya. From

Table 3.19 **Educational level of ever-married women: Teminabuan subdistrict (1996), Irian Jaya and Indonesia (1994); percentage distribution of ever-married women by the highest level of education attended.**

	Ever-married women		
Level of education	Teminabuan	Irian Jaya	Indonesia
None	23.4	36.7	15.9
Some primary	21.5	21.1	31.9
Completed primary	33.9	15.6	28.1
Some secondary+	21.0	26.7	24.1
Missing	0.2	0.0	0.0
Total	100.0 (n=1,382)	100.0	100.0

Sources: Teminabuan survey 1996; CBS *et al.*, 1995, p. 26.

the 1995 IDHS report we know that the Irian Jaya results are based on a relatively small number, which might explain some of the deviations found.

In Teminabuan, about one in four ever-married woman does not have any kind of formal education, while in Indonesia this is one in six. Teminabuan, compared to Irian Jaya and Indonesia, shows a relatively high percentage of women that completed primary school though its percentage of women educated beyond the primary school level is lowest. Compared to the province of Irian Jaya, a higher percentage of the ever-married women of the Teminabuan subdistrict has attended school.

3.5.7 Educational attainment and reasons for leaving school

This subsection first discusses the age pattern of the population by level of education completed. Next, the main reasons for dropping out of school are considered.

Educational attainment

The age pattern by level of education of women is as would be expected in a country where education has become only widespread after the Second World War, and even much more recently in various areas. The age pattern shows that the older the women, the higher the percentage of women with little or no eduction. The percentage of women who have completed primary education and more also decreases with increasing age. Teminabuan men, when compared to Irian Jaya men, find themselves more represented in the lowest level of education, that is primary school, definitely when it concerns those in the older age groups (see Table 3.20). This pattern is even more apparent for women (see Table 3.21).

Table 3.20 **Educational attainment of men over 15 years of age as percentage of various age groups, Teminabuan (1996) and Irian Jaya (1990)**

	Completed Primary School		*Completed Lower Secondary School*		*Completed Upper Secondary School*	
Age group	Temina-buan	Irian Jaya	Temina-buan	Irian Jaya	Temina-buan	Irian Jaya
15-19	37.1	40.0	27.5	26.2	2.4	2.4
20-24	25.5	21.7	32.2	20.9	17.0	28.0
25-29	30.4	22.6	14.5	11.2	26.2	24.2
30-34	40.2	22.8	7.3	10.4	10.8	16.8
35-39	38.2	19.5	10.2	8.5	8.0	13.3
40-44	32.0	15.4	12.0	7.9	6.0	13.5
45-49	35.4	17.0	7.2	6.5	3.6	7.8
50-54	36.2	15.6	2.3	6.9	3.1	6.0
55-74	28.4	10.4	1.0	4.1	0.0	3.5

Sources: Teminabuan survey 1996; *BPS*, 1992, pp. 16, 19.

Quite a difference between urban and rural figures with concern to educational attainment can be observed for Irian Jaya in 1990. Rural areas clearly show lower percentages in the higher educational categories (cf. Appendix 3.1, Tables 1-4). A striking contrast is that in the urban areas quite a number (some 50%) in the youngest age group continued schooling beyond primary school. The percentages that completed upper secondary school or university is clearly higher for men than for women. For the age group 25-49, the percentages of women that completed only primary school are higher than for men. Differences between the sexes in educational attainment are more pronounced in the rural than in the urban areas. In all categories, attainment rates of men are at least 30 per cent higher compared to those of women.

Reasons for leaving school

Of the Teminabuan survey population above 5 years of age, 82.9 per cent have ever attended, or are still attending school (n=5,056). Of this group, 21.4 per cent dropped out of school. In the Teminabuan survey, persons who had left school were asked for the main reason for dropping out. For males and females alike, lack of money was the most common reason given (39.0 and 30.0%, respectively). For women, marrying (15.0%) and disinterest (11.6%) are

Table 3.21 **Educational attainment of all women over 15 years of age as percentage of various age groups, Teminabuan (1996) and Irian Jaya (1990)**

	Completed Primary School		*Completed Lower Secondary School*		*Completed Upper Secondary School*	
Age group	Temina-buan	Irian Jaya	Temina-buan	Irian Jaya	Temina-buan	Irian Jaya
15-19	42.8	32.0	26.4	21.3	2.0	2.6
20-24	41.2	20.5	18.3	12.1	9.1	15.8
25-29	35.2	19.3	7.7	7.0	11.6	10.7
30-34	40.8	18.8	6.8	7.4	6.1	7.3
35-39	45.9	14.3	7.0	5.7	3.5	6.5
40-44	38.9	13.0	6.1	5.0	2.2	4.6
45-49	37.7	11.7	0.0	2.9	0.9	2.7
50-54	26.4	10.6	0.6	2.5	0.0	2.3
55-74	29.1	8.7	0.0	1.8	0.0	0.7

Sources: Teminabuan survey 1996; *BPS*, 1992, pp. 17, 20.
NB Table 3.20 and 3.21 are not standardized for age.

Table 3.22 **Percentage distribution of the main reasons for dropping out of school, Teminabuan survey population, 1996**

Reason for leaving school	Males	Females	Total
Lack of money	39.0	30.0	33.5
Disinterest	14.5	11.6	12.7
Marriage	5.1	15.0	10.3
Boredom	8.3	5.2	6.5
Death of parent(s)	4.4	7.3	5.8
Parents non-permanent in village	3.4	4.1	3.7
Other reasons	25.3	26.8	27.5
Total	100.0 n= 405	100.0 n=479	100.0 n=884

Source: Teminabuan survey 1996.

thesecond and third most frequently given reasons. The second most common answer by men is disinterest (14.5%), followed by boredom (8.3%). Overall, lack of money, disinterest, and marrying are the first, second, and third most frequently given answers (see Table 3.22).

Table 3.23 shows that for all levels of educational attainment, lack of money is the main reason for discontinuing education. Disinterest is only a common reason among those who dropped out of primary school. With increasing level of education, and age, marriage becomes more and more important as a reason to stop schooling.

Table 3.23 **Main reasons for dropping out of school by educational attainment, Teminabuan 1996**

Reason for leaving school	*Level of education completed*		
	Did not complete primary school	Primary school	Lower secondary school
Lack of money	26.7	55.1	45.0
Disinterest	17.5	2.2	3.7
Marriage	7.6	16.0	21.2
Boredom	7.6	3.4	7.5
Death of parent(s)	7.4	2.8	2.5
Parents non-permanent in village	5.3	0.0	0.0
Trouble with teacher	3.2	0.5	0.0
Other reasons	32.3	23.4	27.6
Total	100.0 (n=616)	100.0 (n=174)	100.0 (n=80)

Source: Teminabuan survey 1996.

NB The drop-out numbers for level of education beyond lower secondary school are negligible.

Table 3.24 compares the main reasons for dropping out of school for ever-married women in Teminabuan and Indonesia. Figures by educational attainment are not shown because the number of women aged 15-24 years in the Teminabuan survey is not sufficiently large to allow for meaningful subdivisions. It is evident that there are only a few major reasons for leaving school. In Teminabuan about 75 per cent of the drop-outs are caused by lack of money, disinterest, and marriage. For Indonesia roughly 75 per cent of the failure to complete schooling is the result of a lack of money and marriage.

Table 3.24 **Percentage distribution of the main reasons for dropping out of school for ever-married women currently aged 15-24, Teminabuan 1996 and Indonesia 1994**

Reason for leaving school	Teminabuan 1996	Indonesia 1994
Lack of money	32.9	46.3
Disinterest	14.5	n.a.
Marriage	27.6	26.0
Other	25.0	27.7
Total	100.0 (n=76)	100.0

Source: Teminabuan survey 1996; CBS *et al.*, 1995, p. 27.

3.5.8 Marriage and marriage customs

Marriage is norm in Teminabuan subdistrict. This evidently shows from the percentage of ever-married women and men of age 45 and above. Of the 412 women and 453 men of 45 years and above, 98 per cent have ever been married.

The mean age at first marriage in Teminabuan for females is 19.82 (n=1,335) and for males 24.09 (n=1,227) years. The difference is therefore somewhat more than four years. This agrees with the difference of four to six years (i.e., older husband) Groenewegen and Van de Kaa (1967, Dl. 5, p. 99) found in their research areas in Irian Jaya (cf. Sub-section 5.3.1.2). The median age at first marriage is 19.00 (n=1,335) for females and 23.00 (n=1,227) for males in Teminabuan. On average, though the number of cases is limited, a second marriage takes place about ten years later. Only 36 women and 28 men married a second time, the median age at this second marriage is 31.00 years for women and 34.50 years for men.

The majority of marriages are monogamous. No women were encountered with two or more husbands at the same time. The number of marriages per person was recorded, though it was not indicated whether the first (second, etcetera) marriage was still intact. The percentage of polygenic marriages could therefore not be calculated. The survey figures show that only 2.9 per cent (n=1,364) of all women ever remarried; all, except one, for a second time only. Of the cohort of women aged 45 and over, 5.1 per cent married for a second time (n=395), which leaves 13.6 per cent of women aged 40-49 who were without a partner (widowed, separated, and divorced; n=227). For a man it is not uncommon to marry a second wife if his first wife does not bear any children. Both wives will bear the family name of the husband. 7.2 per cent (n=1,367) of men married more than once. Most (85 cases) of them married twice, few (9) thrice. Only some men had four, six, and seven marriages. In a slight majority of cases (54.3%; n=94), there is no family relationship between the first and second wife. Family

relationship is however common: in 11.7 per cent of cases the second wife is the niece of the first wife. In 9.6 per cent of cases the second wife is the younger sister (somewhat more broadly interpreted than in the West) of the first wife. In 9.6 per cent the second wife is an aunt of the first wife. In 6.4 per cent the second wife calls the first wife *usi*, a general term for a female relative, though the exact family relation is unclear. In another 6.4 per cent of cases the second wife is the elder sister of the first wife. We encountered one case in which the first and second wife were mother and daughter, respectively.

It is common practice among the Tehit population (which is roughly the population within the boundaries of the subdistrict Teminabuan) for a man to remarry immediately whenever a marriage does not work out and the couple divorces. The woman is however supposed to endure (*tahan*) this period of life for a longer time (see Tables 3.25 and 3.26). Women can not look for another husband. They have to wait to be asked again. For a woman who married a civil servant and who becomes widowed, it is not always attractive to remarry. In case she remarries, she loses her rights to pension.

The most frequently given reason for women to divorce and separate is the fact that their husband got engaged with (and married) someone else (46.7%; n=30). In another 20 per cent of cases the husband had left them. For two women the reason why they split up was because their husband (or his family) did not comply with all the bride price payments. Other reasons were: unhappy marriage (1 case), unfaithful husband (1 case), the wife loved someone else (1 case), failure to produce children (1 case).

Marriage rules

Many of the people in Teminabuan subdistrict marry according to *adat* rules, that is, customary law. In Teminabuan the *adat* regarding marriage concerns the following (personal communication with survey team, 1996; cf. Haenen, 1991, pp. 37-50). The (family of the) groom has to make three payments of *maskawin* (bride price) to the family of the bride (cf. Miedema, 1984, pp. 97, 105). When the *maskawin* is paid, *harta senang*, is the last payment the man has to pay for his wife. On top of this, the man has to pay his wife's parents for every child she bears. If the wife dies before the man, and the bride price has not yet been paid in full, then he is required to pay only one more payment (*tulang/honi*) to the parents of his deceased wife. If the wife's parents have already passed away, the payments have to be made to the brothers (*om* = MB) or sisters of the wife's mother.

In daily life this means the following. First of all, it is up to the boy or the parents of the boy to choose a bride. Next, the parents of the girl are consulted. If they agree, discussions on the bride price can go ahead. The girl is not consulted in these matters. This is still common practice in the Teminabuan subdistrict, though in Teminabuan town these practices are already changing (becoming more liberal). Van de Kaa (1971, p. 102) also noted that marriage usually is a matter which concerns groups of relatives, instead of two individuals, and that it requires protracted negotiations. The time(s) and amount of the payments are negotiated till a consensus is reached. When the time of the payments is due, the girl goes to the house of the groom's parents. She goes there, carrying a *nokin* (traditional bag made of woven tree bark) on her head which holds food and precious textiles (*kain timur/kain blok*), which is called *bekal*. This is given to the prospective parents-in-law, as it is not done to go

there empty-handed. She then waits at the doorstep until she is admitted. In return, part of the bride price is paid. The bride price is usually so great that the parents have to borrow from many relatives to be able to pay the bride price. Thus, a web of debt relations is created. According to Miedema, it is within these broad debt relations that decisions are made about who has to contribute what to the bride price (Miedema, 1984, p. 95). The bride price usually comprises material (*kain timur*) but can nowadays also be paid (although not in all areas) with pigs, money, or other goods. Usually, the couple is already considered married before the bride price is fully paid. In this situation, the girl can be under pressure from her family to press her husband and his family to pay the remainder of the price. The related families consider them married when a consensus on the bride price is reached and some payments are made. The community considers them man and wife once they live in the same house. Marriage can not be officially recognized before the bride price is fully paid. It is quite customary that a couple may already have (grown-up) children by the time they marry in church. Only at that time do they receive a marriage certificate (*surat nikah*). Civil marriages are still rare in the research area. Not surprisingly, only 21.3 per cent of the ever-married women (n=1,336) possesses a marriage certificate of their (first) marriage. If the bride price is still not fully paid by the time both wife and husband have died, the remaining debt no longer needs to be paid (personal communication with survey team, 1996).

There are rules which prescribe with whom one is allowed to marry, and with whom not (incest taboo). This has however not been looked at in detail. We know that there are several *sejarah keluarga* (genealogies) in Teminabuan, each of which includes a number of *fam* (families). These *fam* can not intermarry. However, this rule was applied more strictly in the past. Between these *fam*, the blood is considered 'too hot' (cf. Miedema, 1984, p. 135).

Marriage and land use
After marriage, husband and wife till the gardens of both their parents. Until they have two children, the women can go and work on the sago marshes and garden of her parents. Once there are more children, this is no longer considered suitable. She then only helps her parents-in-law.

When a woman divorces, she will, in case there are no children, go back to her parents/*fam*. If, on the other hand, there are children from the marriage, she will continue to work on the land of her parents-in-law. The same holds for a woman who becomes widowed. Fulfilment of the bride price payments does however play a role. In case the couple decides to divorce, the children are considered hers in case the bride price has not been paid completely. If the bride price is however fully paid, the children go and live with their father ('s *fam*). From this rule, various types of adoption follow (Groenewegen & Van de Kaa, 1964, Dl. 1, p. 28)

Naming
A woman can decide to bear the family name of her husband once she is married. The (biological) children all bear the family name of their father.

A newborn is not immediately given a name in Teminabuan. Some three to four days after the delivery, people (from the husband's *fam*) visit and bring *kain*. They suggest a name for the child, a pseudonym (*nama samaran*). Neighbours and others who come to the house will also

suggest a name for the child. The mother and/or father of the child will finally select the name. Often, a name is chosen which begins with the same letter as the month of birth. Nowadays, grandparents are regularly named after as well (first the parents of the husband, then those of the wife). If a child is baptized at a very young age, the pastor may provide a name (personal communication with survey team, 1996).

3.5.9 Marital status

As can be read in the chapter on fertility, the age at first marriage is not extremely low in the province of Irian Jaya . In 1996 it is estimated to be 19.0 for Teminabuan women currently aged 25-49. Child marriages are (or were) in fact something more typical of the province of

Table 3.25 **Percentage distribution of the male population 10 years of age and above by age group and current marital status, Teminabuan 1996**

Age group	*Marital status*					Total	Number of men
	Single	Married	Separated	Divorced	Widowed		
10-14	100.0	0.0	0.0	0.0	0.0	100.0	382
15-19	97.5	2.5	0.0	0.0	0.0	100.0	282
20-24	65.4	34.1	0.5	0.0	0.0	100.0	211
25-29	25.8	70.8	0.0	1.7	1.7	100.0	240
30-34	10.4	87.4	0.0	0.0	2.2	100.0	231
35-39	1.8	96.0	0.0	0.0	2.2	100.0	225
40-44	2.6	95.3	0.0	0.0	2.0	100.0	151
45-49	2.7	91.7	0.0	0.0	6.2	100.0	112
Total	48.6	49.8	0.1	0.2	1.3	100.0	1,834

Source: Teminabuan survey 1996.
NB Figures may not add to 100.0 due to rounding.

Java, although in Irian Jaya quite a few women marry at young ages of 15 to 19 years. In Irian Jaya, the percentage of men that marry before they reach the age of 20 is negligible (3.1%). For women, the percentage that marry before they reach the age of 20 is 26.4 percent in Irian Jaya (*BPS*, 1992, p. 6). In Teminabuan the percentage of women that are married before they reach age 20 is however far lower, that is 7.6 per cent (see Table 3.26). In Teminabuan no marriages are reported to occur before the age of 15.

Table 3.26 **Percentage distribution of the female population 10 years of age and above by age group and current marital status, Teminabuan 1996**

Age group	*Marital status*					Total	Number of women
	Single	Married	Separated	Divorced	Widowed		
10-14	100.0	0.0	0.0	0.0	0.0	100.0	370
15-19	92.4	7.6	0.0	0.0	0.0	100.0	250
20-24	35.5	63.0	0.7	0.7	0.0	100.0	262
25-29	18.9	78.8	0.0	0.8	1.5	100.0	259
30-34	13.4	83.2	0.3	1.0	2.1	100.0	291
35-39	5.1	88.9	0.7	0.5	4.5	100.0	198
40-44	0.8	87.0	0.8	0.8	10.6	100.0	131
45-49	2.8	81.1	0.0	1.9	14.2	100.0	106
Total	42.6	53.9	0.3	0.6	2.6	100.0	1,867

Source: Teminabuan survey 1996.
NB Figures may not add to 100.0 due to rounding.

Percentage distribution of marital status of survey population, Teminabuan 1996 (n=6,238)

Single : 57.0
Married : 38.6
Separated : 0.2
Divorced : 0.3
Widowed : 3.9

Figures on the percentage distribution of males and females in Teminabuan subdistrict (Tables 3.25 and 3.26) show that men start marrying at a later age compared to women. Furthermore, of the couples who separate or divorce, men seem to remarry more easily. This may also hold for men who become widowed, even though more women than men become widowed (by age group), as men, overall, have a lower life expectancy.

Absolute numbers are presented in Appendix 3.1, Tables 5 and 6 for males and females by marital status of Irian Jaya 1990. When comparing the percentage distribution of the female population of Teminabuan with those of Irian Jaya it shows that, on average, women in the province marry at an earlier age than in Teminabuan (see Table 3.27). Besides, the percentage of divorced women in Irian Jaya is higher. This might indicate a higher rate of divorce and/or a smaller chance of remarriage compared to Teminabuan women. Furthermore there is a higher percentage of widowhood in every age group in Irian Jaya compared to Teminabuan.

One would conclude that the life expectancy of men in Irian Jaya in 1990 is lower than that of Teminabuan men in 1996. Chapter four, which includes estimates of life expectancies, unfortunately does not include an estimate for the province of Irian Jaya.

Table 3.27 **Percentage distribution of the female population 10 years of age and above by age group and current marital status, Irian Jaya population census 1990**

Age group	*Marital status*				
	Single	Married	Divorced	Widowed	Total
10-14	99.6	0.4	0.0	0.0	100.0
15-19	73.6	25.7	0.5	0.2	100.0
20-24	27.7	70.4	1.6	0.8	100.0
25-29	7.6	88.5	1.9	1.7	100.0
30-34	3.0	90.8	2.5	3.7	100.0
35-39	1.8	88.7	2.6	6.9	100.0
40-44	1.6	81.7	2.7	14.0	100.0
45-49	1.0	74.7	3.1	21.2	100.0
Total	33.9	60.8	1.6	3.6	100.0

Source: *BPS*, 1992, p. 6.

Comparing Teminabuan data (Table 3.26) with Indonesian DHS data (Table 3.28) on the marital status of women, a somewhat earlier onset of marriage can be observed in Indonesia. Proportions of divorcees are slightly higher in Indonesia whereas widowhood is somewhat more prevalent in Teminabuan at higher ages.

Having compared Teminabuan data with the data of Irian Jaya and Indonesia, it can be concluded that Teminabuan women, on average, marry later. This can partly be ascribed to the difference in marriage traditions. Child marriages hardly occur in Teminabuan, contrary to other parts of Indonesia. On top of this, as will be explained in Chapter 5 on fertility, the age at menarche is relatively high in Teminabuan. Young women, even if married, would therefore not yet bear any children.

Table 3.28 **Percentage distribution of the female population 10 years of age and above by age group and current marital status, Indonesia 1994**

	Marital status				
Age group	Single	Married	Divorced	Widowed	Total
10-14	n.a.	n.a.	n.a.	n.a.	n.a.
15-19	82.0	17.0	0.9	0.1	100.0
20-24	37.5	60.0	2.0	0.6	100.0
25-29	14.0	82.5	2.7	0.8	100.0
30-34	5.1	90.3	2.8	1.8	100.0
35-39	3.0	89.3	3.2	4.4	100.0
40-44	2.4	86.9	4.3	6.4	100.0
45-49	1.8	83.4	4.1	10.8	100.0
Total	26.5	68.3	2.6	2.6	100.0

Source: CBS *et al.*, 1995, p. 117.

3.5.10 Ethnicity

Though no direct question was included in the Teminabuan survey questionnaire with regard to the person's ethnic background, a good estimate can be made if we look at the province of birth of the person's father. This question is only asked to persons aged 18 and above. The figures show that 88.0 per cent (n=3,236) of the fathers are born in the province of Irian Jaya, by which they are most likely of Papuan origin. This is a very plausible percentage. The other main provinces of origin are: South Sulawesi (5.2%), the Moluccas (2.4%), the provinces (east, mid, and west) on Java (2.1%), and North Sulawesi (1.1%).

A somewhat different picture is given by Manning and Rumbiak (1989, p. 89) concerning the province of Irian Jaya. They indicated that major influences on the ethnic composition of the population of an area are transmigration settlement areas, and/or whether there is a demand for skilled labour, like in towns. This definitely changes the picture. Manning and Rumbiak found that over the period 1971 to 1990, an increasing percentage of the population of Irian Jaya are inmigrants. In 1971 this was only four per cent, while in 1990 the proportion of inmigrants had increased to 21 per cent of the total population of Irian Jaya. In the rural areas

the inmigrants are predominantly transmigrants. Until 1996 there were no transmigrant settlement areas in Teminabuan subdistrict[9].

3.5.11 Religion

As a result of the extensive work of the missionaries, predominantly in the period 1950-62, 89.0 per cent of the population of Teminabuan subdistrict are Christians (Protestant/Baptist), 1.2 per cent is Catholic, and 9.8 per cent is Muslim (Teminabuan survey 1996). The only two mosques are located in the village of Kaibus, where the Bugis traders, military personnel, and civil servants from Java live. All villages have a church, and in a Baptist community, there are even two churches.

Religion plays an important role in the social life of the people of the subdistrict (Pemerintah Kabupaten Daerah Tingkat II Sorong, 1992a, p. 23). This is very evident in the villages. A common characteristic for instance is that those people who stay in their gardens for a few days, usually return to the village on Saturday, so they can at least attend Sunday service. There are also weekly religious meetings organized for all kind of subgroups such as adults, women, children, and youth. This creates an opportunity for the people to meet after work and socialize. As an example of the socializing factor religion plays it can be mentioned that Christmas is celebrated in church, within the family, with the parents, with the neighbours, with the women's association, etcetera, and all on separate occasions. Besides regulating social life, the religious groups support a considerable number of schools in Teminabuan subdistrict. In 1991, 18 of the 26 primary schools, and one of the two upper secondary schools are financed by religious groups (Pemerintah Kabupaten Daerah Tingkat II Sorong, 1992a, p. 26).

3.5.12 Language

In the Teminabuan survey the heads of the households were asked which language was used daily at home. Some said that they spoke Indonesian as well as a local language, with the explanation that among family members they use the local language, though with visitors or even neighbours they may use Bahasa Indonesia. This happens when the local languages the people use are not the same, as is true for a village like Waigo. One part of the population speaks Tehit (the main local language of the Teminabuan subdistrict) and another part speaks Maybrat (the main local language of the Ayamaru subdistrict). However, not all people are bilingual in these two languages. Also the population from other islands, some of whom speak for instance the local language of Macassar, will have to use a common language to communicate with their neighbours. All in all, 56.6 per cent (n=1,399) of the households use Bahasa Indonesia as the daily language in the house, 76.9 per cent use a local (Papuan) language, while 5.2 per cent use another language. Of the households that use a local

[9] There is a transmigration site in the neighbouring subdistrict of Aytinyo. Its effects on the population of Teminabuan is described in Chapter 6.

language, 77.8 per cent (n=1,066) speak Tehit and 13.0 per cent speak Maybrat. In Teminabuan subdistrict, albeit such a relatively small area, there are as many as eight dialects of the Tehit language, to wit: Tehit Afsia, Tehit Gemna, Tehit Gnagna, Tehit Imyan, Tehit Kfhar, Tehit Saifi, Tehit Sfa, and Tehit *kota*. The last three mentioned are the dialects mostly used. We have not made any inquiries to confirm whether this is an exclusive list, or if for instance, Tehit *kota* is a mix of (some) of the dialects mentioned. So in Teminabuan we find the local languages Tehit, with all its dialects, Maybrat, and Ogit (spoken by 5.3% of households using a local language as their daily language). Besides these three main local languages, there is a handful of local languages which is spoken by people originating from other subdistricts like Inanwatan. Their number is however negligible.

As is to be expected, data on the population of Irian Jaya (*BPS*, 1992, pp. 43-44) show that the percentage of people using a local language as their daily language is much higher in the rural areas than in the urban areas. Urban areas contain by definition a mixture of people with a different cultural background. Given the fact that languages have been used in such restricted, isolated areas, it is obvious that people here will have to rely on a common language.

Chapter 4 Mortality

4.1 Introduction

The objectives of this chapter on mortality are to describe the mortality level and pattern found in the present-day Teminabuan research area and to elaborate somewhat on their background. There are two reasons why the emphasis is on infant and child mortality. First, they are seen as useful indicators of the state of development of a population. Second, the Teminabuan sample size is small, and except for the youngest age group, the numbers of deaths recorded are too small to estimate death rates. Still, age-specific death rates based on vital statistics are estimated, but only up to age 15 (see Sub-section 4.4.1). To put the findings of the research area in a broader perspective, they are compared to those of Indonesia and/or Papua New Guinea (PNG).

The background of mortality, the main causes of death and how they effect the age-specific death rates will be subjects of discussion. As far as the data permit, Mosley and Chen's (1984) list of proximate and socio-economic determinants of under-five mortality has been applied to examine which and to what extent they influence under-five mortality in the research area. The results are compared to those of Indonesia or PNG.

The data source used for the research area is the 1996 Teminabuan survey, also referred to as the Teminabuan survey. For comparison with Indonesia and PNG, the 1994 Indonesian Demographic and Health Survey data, the 1971 and 1980 Indonesian census data, the 1971 and 1980 census data of PNG, and some small-scale studies are used.

Before discussing the mortality measures and their background, an outline will be presented on how the health services have developed in the research area over the years.

4.2 Mortality and the expansion of health services in historical perspective

Most of the information here is derived from the book 'Demographic Dimension in Indonesian Development' written by Hugo *et al.* (1987).

Similar to the pattern of mortality observed in Europe in the 18th and 19th centuries, the pattern of mortality in Indonesia before 1800 was one of high mortality with large fluctuations due to epidemics, wars, or famines. Though little information is available about mortality trends in Indonesia in the 19th century, it is very unlikely that mortality declined substantially during this period as until the beginning of the 20th century public health programmes were close to non-existent. Only smallpox vaccination had started in the beginning of the 20th century on

Java. According to Gardiner and Oey (cited by Hugo *et al.*, 1987, p. 108), these high mortality rates and the large fluctuations persisted at least until the end of the 19th century. For the outer islands, even less change during this period is to be expected, as effects of warfare and new introduced diseases were more prevalent there.

In the first decades of this century, the number of trained medical doctors in Indonesia did not increase quickly because the colonial government insisted that medical courses were taught in Dutch. Besides, the medical profession itself was most interested in large, well-equipped hospitals found in only a few cities. The provision of public health began with campaigns against smallpox, which, as mentioned earlier, only started in the beginning of the 20th century. Furthermore, small-scale programmes were launched against cholera and malaria. As a matter of fact, these programmes were mainly limited to Java. In the late 1920s and 1930s the colonial government became however convinced of the need of public health programmes and initiated many activities in this field such as training of midwives, health education at schools, epidemiological investigations, collection and study of birth, morbidity and mortality statistics, and so on. In spite of the major efforts made by the colonial rule in the 1930s, Gardiner and Oey (cited by Hugo *et al.*, 1987, p. 109) estimated its impact on the health of the local population to be very limited. Nevertheless, these efforts had resulted in an elaborate public health infrastructure which was extended to many areas of the Indonesian archipelago. These efforts came however to an end when the Japanese invaded Indonesia in 1942. The Japanese invasion lasted from 1942-45, followed by the war for independence from 1945-49. All these circumstances caused a decrease in the rate of population growth, probably due to a fertility drop and a mortality rise during this period (Utomo & Iskander, 1986, p. 13). Still, Gardiner and Oey contended that mortality declines which took place before the Japanese invasion, were due more to changes in agricultural production methods and conditions than to improved medical services.

Between 1950 and 1970 there were vast health problems in Indonesia. Public health programmes such as the malaria and the smallpox eradication programmes yielded quite some success. The number of trained health personnel however still remained very limited. During this period there was on average one doctor per 100,000 people. Another programme which was launched during the 1950s and 1960s was the formation of a network of maternal and child health centres, the so-called BKIA (*Balai Kesehatan Ibu dan Anak* (Mother and Child Health Care)).

Initiated during the first *Repelita* (*Rencana Pembangunan Lima Tahun* (five-year development plan; 1969-74) and realized during the second (1974-79) was the objective that primary health should be within everyone's reach. Because of this, every 3,500 subdistricts (having on average a population of 43,000 in 1980) was provided with a *puskesmas* (community health centre). According to the plan there should be a doctor in every *puskesmas*. Although in number this was quite possible, unequal distribution of doctors, who were particularly less present in remote areas, ensured that this part of the plan was only partially realized. Besides, in spite of the fact that health services were now within reach of a great part of the population, utilization was only as low as 20 per cent of the target population in the early 1980s. Reasons for underutilization are plentiful, such as preference

for traditional medicine to treat some diseases; costs and travelling time to visit the health clinic were considered too high; uneducated people felt uncomfortable with the attitudes of the modern health personnel, which discouraged visits to the clinic; the supply of medicines did not meet the demand for it (cf. Iskandar & Riks, in: Hugo *et al.*, 1987, pp. 111-112). Data from the Indonesian Central Bureau of Statistics however showed that in the early 1980s already some 40 per cent of the persons who reported an illness in the week prior to the census, went to a health centre for treatment. This figure can be interpreted to indicate quite a substantial degree of acceptance, as only some of the illnesses needed the services of a health provider as for some illnesses traditional medicine worked adequately. It is worth pointing out that the utilization percentages presented by the CBS for the early 1980s are twice as high as those given by Hugo *et al.* (1987).

In 1976 and 1978 two national primary health programmes were initiated. These were the Family Nutrition Improvement Programme (*Usaha Perbaikan Gizi Keluarga* or *UPGK*) and the Village Community Health Development Programme (*Pembangunan Kesehatan Masyarakat Desa* or *PKMD*). The *UPGK* particularly aimed at training personnel to provide health education on nutrition, maternal and child health, child weighing programmes, and the like. The *PKMD* focused on training village-level health workers to provide education on nutrition, to treat common illnesses, and to supervise the environmental health conditions. Compared to the *puskesmas* these health facilities had a higher degree of utilization and reached poorer people. In the late 1970s the 'Road to Health Chart' was promoted, with the hope that mothers would monitor the development of their children and know when the child had to be taken to a health post. In 1984 this concept was broadened to integrate a variety of medical services, such as vaccination, provided by the health posts. These newly created posts were called *posyandu* (integrated health service post), whose number increased rapidly. In 1986 there were already some 48,000 *posyandu* in the Indonesian archipelago. During the second half of the 1980s, the Ministry of Health claimed to have trained some 100,000 midwives. These moves were used to speed up the immunization programme, which became one of the priorities of the national health programme.

Data on mortality decline in Indonesia between 1900 and 1996 are largely restricted to data from Java, and often only concern selected areas. 'Even today [1986], there still is no well-developed vital registration system in Indonesia that would yield complete and accurate data on births and deaths for the whole nation' (Utomo & Iskander, 1986, p. 13), a statement which at least holds for the province of Irian Jaya until 1996. In former times data sources were different from the ones demographers currently use to base demographic parameters on. Nowadays, mortality statistics of developing countries are customarily derived by using indirect techniques, data on children ever born and children surviving by age group of mother. On the basis of these data, infant and child mortality rates are calculated. Historical mortality data are usually based on local studies, extrapolations based on official records, or from 'educated guesses' of scholars, demographers, and historians.

In the period before 1940, life expectancy at birth was estimated to lie between 30 and 35 years for Indonesia, which corresponds with an infant mortality rate of 225-250 per 1,000 live births. The crude death rate (CDR) for this period was estimated to range between 15 and 23

per 1,000. The CDR is the number of deaths in a population during a specified period divided by the number of person-years lived by the population during the indicated period. The CDR for a single year is usually calculated as the number of deaths during the year divided by the mid-year population (United Nations, 1983, p. 302). Deaths of all age groups and the age distribution of the population under study therefore influence the value of the CDR.

During the Japanese occupation and the revolution against the Dutch (1942-49) mortality rates increased. For obvious reasons, not many reliable mortality statistics are available from this time. Retrospective fertility research in 1973 however showed that infant mortality rates were indeed higher during this specific period, for instance the infant mortality rate (IMR = the probability of dying between birth and the exact age of one) in a Yogyakarta village for the period 1944-1948 was estimated to be 271 per 1,000.

In the 1950s, mortality declined again because the war with The Netherlands came to an end and health facilities expanded. Utomo and Iskander (1986, p. 14) even speak of a turning point in the mortality history of Indonesia. The CDR was estimated to lie between 20 and 25 per 1,000. Based on the various estimates made for the 1950s, Utomo and Iskander (1986, p.23) estimate the CDR to lie between 20 and 30 per 1,000, and the IMR between 100 and 300 per 1,000 for the whole of Indonesia.

When comparing IMRs of Indonesia with postwar data of PNG, the IMRs were somewhat similar. On the basis of estimates made by Van de Kaa, Bakker (1986b, p. 109) assumes that in the first years after the Second World War, infant mortality for both sexes must have been as high as 200 per 1,000 live births in PNG. Life expectancy at birth in PNG fluctuated around 30 years, although for males it was somewhat more than for females in those days.

Several sources estimated the CDR for the 1960s to lie between 16 and 22 per 1,000. There is however reason to think that the CDR did not decline steadily, but in fact fluctuated quite a bit. Especially in the mid-1960s, when health facilities were deteriorating and the nutritional conditions worsened, this most likely resulted in a temporary increase of the CDR. For Indonesia as a whole the IMR was estimated to lie around 175 per 1,000 in the late 1950s, and dropped further to 140 per 1,000 at the end of the 1960s (cf. Utomo & Iskander, 1986, p. 23). There have been different estimates for child mortality during this period, but the main conclusion is that it fell dramatically between the late 1950s and the late 1960s.

According to a joint CBS and UNICEF publication of 1984 (Utomo & Iskander, 1986, pp. 23-24), the IMR in Indonesia decreased by about 32 per 1,000 a year during the 1970s. Utomo and Iskander ascribe this to the rapid economic growth and development of this period. Based on Dasvarma's 'optimistic' estimate of the IMR, that is under the assumption that mortality continues to decrease with 3 per cent per annum in the 1980s as well, the IMR for Indonesia was estimated to be 92 per 1,000, while the IMR for Irian Jaya was estimated a little higher, that is 101 per 1,000 for the year 1983.

UNICEF (1997) presents data over a long period of time for both Indonesia and PNG. Their estimates (see Table 4.1) show that all 3 indicated mortality rates dropped considerably from

1960 to 1995. The CDR of Indonesia and PNG of 1995 even match those of The Netherlands (CDR=9 in 1995), although the different age distributions will clearly hide some of the existing differences in death rates. Under-five mortality decreased drastically in PNG from 1960 to 1980 but remained stable afterwards.

Table 4.1 **Infant mortality, under-five mortality, and the crude death rate (CDR) for Indonesia and Papua New Guinea, 1960 to 1995, per 1,000**

	IMR		*Under-five mortality*			CDR	
Country	1960	1995	1960	1980	1995	1960	1995
Indonesia	127	50	216	128	75	23	8
PNG	165	67	248	95	95	23	10

Source: UNICEF, 1997, pp. 80, 88, and 96.

Due to this drop in mortality rates, the number of children below age five who died in Indonesia in 1983 and 1995 was reduced from half a million (Utomo & Iskander, 1986, pp. 23-24) to 354,000 (UNICEF, 1997, p. 80).

4.3 Mortality level

The level of mortality is very closely related to the level of socio-economic development in a particular area. As a consequence, many governments use mortality levels as indicators for planning, monitoring, and evaluation purposes. Of all mortality indices, infant and child mortality are considered the main indicators of the socio-economic and health status of the entire community and its living conditions. Another reason to take the mortality level as an indicator for socio-economic well-being is that mortality usually responds rapidly to changes in the socio-economic circumstances such as sanitation, water supply, housing, or changes in the medical field. It therefore provides a standard for measuring the impact of changes (Bakker, 1986b, pp. 5-6).

This section addresses the level of mortality for the various categories of the population. As mentioned above, infant and child mortality are regarded as main indicators for the socio-economic and health condition of a community. Infant and child mortality are therefore discussed in separate sections. The level of mortality at ages beyond childhood is dealt with in the section on 'mortality at other ages'. Since maternal mortality in developing countries is still of such magnitude, a separate section is devoted to this subject as well. The data[1]

[1] The Teminabuan survey provides data with which mortality measures are calculated. The main figures are the following: number of live births: 4,884, number of infant deaths: 342, number of deaths between ages one and five: 154. However, the figures used do not always add up to the aforementioned numbers due to missing cases when more variables are involved or specific time periods are referred to.

sources used are the 1996 Teminabuan survey (infant and child mortality), historical studies on Irian Jaya (infant and child mortality, and mortality at other ages), the 1994 IDHS (infant, child, and maternal mortality, and mortality at other ages), and 1971 and 1980 PNG census data (infant, child, and maternal mortality, and mortality at other ages). For maternal mortality we are dependent on estimates as reliable data are not available for Indonesia or PNG. The level of mortality above age 5 is only sketched in broad outlines as vital registration, which would provide the data base, is not sufficiently complete and reliable for Indonesia or even Teminabuan (cf. Chapter 2).

Like many other developing countries, Indonesia is characterized by relatively high mortality rates for children under five years of age, and especially those below one year of age. Since the 1950s, mortality rates in Indonesia are however on the decline. The infant mortality rate is estimated to be 57 deaths per 1,000 births in Indonesia for the period 1989-1994, while the under-five mortality rate (= the probability of dying between birth and the exact age of five) during this period was calculated to be 81 deaths per 1,000 births (CBS *et al.*, 1995, p. 137).

Over the last 15 years, infant mortality declined by 24 per cent. Postneonatal, child, and under-five mortality declined at a somewhat faster rate than neonatal mortality. Neonatal mortality is the probability of dying within the first month of life, whereas postneonatal mortality expresses the probability of dying after the first month of life but before the exact age of one (CBS *et al.*, 1995, p. 135). The relative rates of decline in infant and child mortality are of major importance to policy implications aimed at lowering mortality rates. Infant mortality is very often related to delivery practices and malnutrition of the mother, while child mortality is usually caused by external factors, such as vector-borne diseases, nutritional deficiencies and accidents. Antenatal care is definitely an answer to infant mortality, whereas policy measures directed to reduce child mortality are more difficult to realize, as they require major improvements in the household economy and environment (Hugo *et al.*, 1987, pp. 121-122). As with the IMR, the child mortality rates for Indonesia are high compared to Asian standards. Government programmes have been set up, at village level, to tackle the problem of the high mortality of the *balita* (*balai lima tahun* (under-fives)). These programmes consist of monthly check-ups of the weight of children. Furthermore, education on health and nutrition is given, and vaccinations are provided (Hugo *et al.*, 1987, p. 122).

4.3.1 Infant mortality

Though this sub-section addresses infant mortality, data on child mortality are sometimes given as well. In this sub-section on infant mortality we will begin with (1) the definition of infant mortality, which is then followed by (2) a description of conditions which influence infant mortality. Next, data on various areas are presented, that is, (3) Teminabuan subdistrict, (4) Irian Jaya, and (5) Indonesia and Papua New Guinea.

1. Definition

Infant mortality is defined by the number of deaths which occur in the first year of life, after a live birth has taken place, related to the number of live births. In their study in Dutch New Guinea, Groenewegen and Van de Kaa (1967, p. 46) used as definition for a 'live birth': those children who by their mother or father were considered alive at the time of birth. This is different from the definition the World Health Assembly proposed, which though more accurate, is too difficult to work with during fieldwork. Signs of life, which were not very noticeable, like heart beating without breathing, might therefore be overlooked and unnoticed. In the Teminabuan survey a live birth is defined as a birth where a baby shows some sign of life, such as breathing or beating of the heart. Deaths occurring before expulsion are called fetal deaths, irrespective of the stage of advancement of the pregnancy at time of expulsion. A fetal death which occurs after 28 weeks of gestation is also called a stillbirth. Fetuses who die before 28 weeks of gestation are called abortions or miscarriages. Abortions can be either induced or spontaneous. High intra-uterine death rates affect the number of children ever born to women, because as a consequence of abortions, birth intervals are extended.

2. Conditions influencing infant mortality

This section deals with conditions of the child as well as of the mother, which influence the chance of survival of the child. The characteristics discussed are: (a) malnutrition, (b) low birth weight, (c) difference by sex, (d) age of the mother, (e) age at marriage, (f) birth interval, (g) birth order. Those conditions which are already discussed in other sections will not be repeated here. This applies to the subjects 'age of the mother' and 'birth order' which are dealt with in Sub-section 5.3.1. Here, only additional/new information will be presented. However, it should be kept in mind that in measuring differences in mortality according to various characteristics of the population, it is important to note that many characteristics are interrelated (Utomo & Iskander, 1986, p. 26), as is illustrated in the discussion on the birth interval.

A. Malnutrition

Malnutrition in itself might not cause a child to die, but as has been indicated in Sub-section 3.3.3 as well, malnourished children are more susceptible to infectious diseases than well-nourished children. Being sick, the child feels even worse and has a reduced appetite, which further weakens the child (Utomo & Iskander, 1986, p. 38). Van Norren and Van Vianen (1986) speak in this respect of a malnutrition-infection syndrome. Utomo and Iskander (1986, p. 37) found malnutrition to be associated with some 16 per cent of child deaths in Indonesia, and 9 per cent of the neonatal and postneonatal deaths.

Van der Hoeven (1956c, pp. 281-282) observed a high rate of infant mortality in Irian Jaya. No quantitative measures are given however. By examining the causes of spontaneous abortions Van der Hoeven tried to get a better insight in the causes of infant mortality as well. According to his information high rates of spontaneous abortions are usually due to chronic malnutrition and avitaminosis of the mothers because:

1. Chronic nutritional deficiencies of the mother may influence the uterine mucosa in its proliferative phase, with a degenerated uterine mucosa as a possible result.

2. Chronic deficiencies of the mother may interfere with the organogenesis of the embryo and the foetus, causing death in utero and congenital disturbances.

B. Low birth weight

From research it is known that low birth weight predisposes children to illnesses. Birth weight is not systematically measured all over Indonesia, but it might be presumed that children who are considered small at time of birth are likely to have a low birth weight. In the IDHS (CBS *et al.*, 1992) questionnaire mothers were asked how they judged their children's health at birth by indicating their length at birth, classified as less than, equal to, or above average. It showed that infants of mothers who judged them to be very small at birth were ten times as likely to die in the neonatal period than infants whose lengths were judged average or above. After the neonatal period, the mortality rates proved to be similar for all children.

Puffer (1983, cited by Utomo & Iskander, 1986, p. 37) stated that mortality rates of babies with a birth weight below 2,500 grams at birth, are 5 to 9 times higher compared to children who weigh 2,500 to 2,999 grams at birth. Compared to children with a birth weight of 3,000-3,999 grams, these low birth weight children have even a 7 to 13 times higher mortality rate. Young mothers of below 20 years of age showed twice as many low birth weight children compared to their counterparts of 25-30 years of age. Besides, with the age of the mother, birth weight is also associated with the nutritional status of the mother. Expecting and lactating women who suffer from malnutrition negatively affect the birth weight of the child as well as its subsequent nutritional well-being in cases of breast-feeding (Utomo & Iskander, 1986, p. 38).

C. Difference by sex

Utomo and Iskander (1986, p. 27) refer to Indonesian data of the early 1970s and conclude that on average there is a 28 per cent excess male mortality among the under-fives. In their opinion this is in accordance with the common observation that males have a higher risk of dying than females. Van der Hoeven (1956e, pp. 303-308) on the contrary observed in Irian Jaya equal mortality ratios for boys and girls in the first year of life. As the variable sex was not included in the questionnaire items pertaining to fertility history in the Teminabuan survey, no death analysis by sex is possible for these age groups.

D. Age of the mother

This subject is discussed in Sub-section 5.3.1. In addition, the analysis of the Teminabuan data shows that children born to relatively young and old mothers face an increased risk of dying within the first year of life. The IMR of children born to Teminabuan mothers younger than 18 years of age is 88.1 per 1,000 (n=295), and the IMR of children of 35+ mothers is 84.8 per 1,000 (n=613). Children born to mothers of age 18-29 have an IMR of 70.4 (n=2,767), and children born to mothers of age 30-34 have an IMR of 78.2 (n=754).

E. Age at marriage

Utomo and Iskander (1986, p. 27) contend that early marriage is associated with a poor socio-economic condition, while women marrying at older ages tend to have a higher educational level and more knowledge of health care and hygiene. Early marriage, aside from the fact that

it leads to young ages at childbirth, is therefore associated with poorer chances of survival. Because of hardly any differentiation by age at marriage as well as socio-economic background, no analysis on the relationship between age at marriage of Teminabuan women and child survival was possible. Even if Papuan women as opposed to non-Papua women probably do show these differences, the numbers available are too small and confounding factors inhibit useful analysis on this topic.

F. Birth interval

Both the child's and the mother's health condition are related to the length of the (preceding) birth interval(s). Children born after a short birth interval have higher risks of illness and death. Furthermore, the sooner the next baby arrives, the shorter the duration of breast-feeding. Short birth intervals leave mothers with little time for recovery, which may hamper their care of the children. It was assumed that socio-economic factors would affect the birth interval. For instance, women with lower levels of education show lower levels of contraceptive use (CBS *et al.*, 1995, p. 74) and hence, are expected to have shorter birth intervals. However, according to the 1994 IDHS data (CBS *et al.*, 1995, pp. 47-48), birth intervals are little influenced by the child's birth order, sex, urban-rural residence, and the mother's education. On the other hand, the birth intervals significantly differ by the mother's age and the survival status of the previous child. Younger women tend to have shorter birth intervals (median is 25.9 months for mothers aged 15-19) than older women (median is 51.4 months for mothers aged 40-44). In the event that the preceding sibling is still alive, the birth interval is some 15 months longer compared to when the preceding sibling died. These interrelations mentioned above are probably not directly applicable to the Teminabuan situation. In fact, we have observed that although the Teminabuan population has a relatively low level of education, traditional methods of contraception (which includes abstinence, withdrawal, and *KB kampung*, the last-named being the most predominant; see Sub-section 5.3.2) are extensively used and long periods of breast-feeding are practised. Both increase the length of the birth interval.

G. Birth order

In addition to the data presented in Sub-section 5.3.1, here we show data on Teminabuan which highlights the relationship between birth order and IMR. From the data it can be concluded that the first child clearly has the best chances of survival. Although children with a birth order of 2 till 5 face a somewhat elevated risk of dying, their chances of survival are reasonable. However, children with a birth order of 6 or more are definitely subject to a higher risk of mortality. Infant mortality rates of children by birth order are presented in Table 4.2.

Table 4.2 **Infant mortality (IMR) by birth order of the child, Teminabuan subdistrict**

Birth order	No. of live births	No. of infant deaths	IMR per 1,000
1	1,245	69	55
2	1,072	77	71
3	856	60	70
4	638	46	72
5	436	29	66
6	293	26	88
7+	344	35	101
Total	4,884	342	70 (overall)

Source: Teminabuan survey 1996.
Note: The data pertain to the entire (retrospective) period covered by the survey.

3. Data on Teminabuan subdistrict

The live births reported by the ever-married women in the Teminabuan survey number 4,884, 342 of whom died before they reached age one. Of all the deaths which occurred since 1990 and which are reported during the 1996 household survey in Teminabuan, 32.6 per cent (n=232) fall in the category of below one year of age. Though the level of infant mortality is not as high as it was in the beginning of this century, it still is substantial in the subdistrict of Teminabuan. Comparing the IMR of 93 per 1,000 live births for the Ayamaru district in the 1950s as was found by Van der Hoeven (1956c, pp. 303-308; cf. (4) Data on Irian Jaya) with the overall 70 per 1,000 (see Table 4.3), it can however be concluded that infant mortality has declined over the years.

The validity of the figures in Table 4.3 is clearly open to criticism because of the low numbers and especially recall lapse concerning births and in particular, infant deaths, which have taken place in a more distant past. The incongruity between the overall IMR as presented in Table 4.2 and Table 4.3 can surely be ascribed to this phenomenon. After all, the IMR for the period before 1965 is relatively low (46 per 1,000). Looking at the IMRs from the 1980s onwards, we can conclude that the infant mortality rates have fluctuated but remain at a relatively high level.

In 1995, 205 live births were reported by the households. With an average IMR of 70 per 1,000 live births (taken from Table 4.3), this means that 14 of these children will not live till their first birthday.

As IMRs by sex could not directly be derived from the Teminabuan survey data, it was necessary to estimate them. Deaths by age and sex were available from 1990 onwards, from which we could derive the percentage of males and females below one year of age.

Table 4.3 **Infant mortality for five-year periods and individual years from 1965 to 1994, Teminabuan subdistrict**

Reference period	No. of live births	No. of infant deaths	IMR per 1,000
< 1965	491	23	46
1965-1969	352	24	68
1970-1974	451	23	50
1975-1979	585	37	63
1980-1984	759	59	77
1985-1989	794	52	65
1990-1994	1003	82	81
1990	180	18	100
1991	175	15	85
1992	211	16	75
1993	216	21	97
1994	221	12	54
1965-1994	3944	277	70

Source: Teminabuan survey 1996.

In general, the sex ratio at birth is 104 over 100 (M/F), though survey data on births from 1995 onwards made us believe that for Teminabuan it was 92 over 100. Looking at the population pyramid however, where the three lowest age groups show an excess of males, this is somewhat unlikely. We therefore held on to the 104/100 ratio. As a consequence, the male IMR is estimated to be 83.33 per 1,000 live births, while the female IMR is estimated to be somewhat less, that is 62.72/1,000[2]. These data apply to all births recorded from ever-married women which occurred before the 1st of May 1995.

4. Data on Irian Jaya

Based on population data of the inhabitants of Dutch New Guinea from government censuses, baptismal registers, and information given by mothers about their children, Van der Hoeven (1956c, pp. 303-308) made, apart from those already mentioned, the following observations for Irian Jaya in the early 1950s.

- Infant mortality on the north coast averaged 230 per 1,000 live births. Van der Hoeven (1956e, p. 305) estimated the IMR of the (former) Ayamaru district at 93/1,000 (n=1,126).
- Infant mortality is less in Bird's Head Peninsula and in the Wissel Lake District.

[2] The proportion of deaths by sex was calculated for deaths which were reported to have occurred since 1990 in the age group 0-1 (58% male; 42% female). Then, the general sex-ratio (1.04) was applied to all recorded live births before 01/05/1995 (n=4,520), which resulted in an estimate of 2,304 male births and 2,216 female births. Children (both sexes) of this group who were reported to have died before age 1 numbered 331, a figure which was segregated by sex according to the sex ratio of the deaths under 1 year of age since 1990. Accordingly, the infant mortality rate for males numbers 192/2,304=83.33 per 1,000, and for females 139/2,216=62.72 per 1,000 live births.

- The total number of children born per woman is highest on the north coast, a little lower around the Wissel Lake and lowest in the lake district of Bird's Head Peninsula where the nutrition was comparatively better.
- The higher the average number of children who die per woman, the higher also the number of births per woman: the same (though converse) was observed in the Lake District of Bird's Head: the lower the infant mortality, the lower the number of births per woman.
- Infant mortality is highest on the coast, where anaemia among the mothers is severe.

On the basis of the data gathered in the study areas in Dutch New Guinea, the infant mortality rate is estimated to have been about 200-225 per 1,000 live births during the prewar (World War II) period, after which it increased by some 100-125/1,000 during the war, and declined by some 80-100/1,000 prior to the survey of Groenewegen and Van de Kaa (concerning Schouten-isles and Numfor [1967, p. 57]). Groenewegen and Van de Kaa (1967, pp. 49-69) estimate a general level of infant mortality of about 150/1,000 in their research area in the mid-1950s, and a continuing decline thereafter. The decline is ascribed to the introduction of various health measures such as a mother and child care programme, vaccination programme, and anti-malaria programme. As a result the life expectancy increased from about 35 in prewar times to some 55-60 years around 1960.

Hill and Weidemann (1989, p. 41) give an IMR of 117 for boys and 98 for girls for Irian Jaya in 1977 (based on data from the Indonesian Central Bureau of Statistics), which is the same as for Indonesia in total. They found that, excluding the isle of West Nusa Tenggara, the IMRs in Indonesia for boys ranged from 70-141 and for girls from 56-120 in 1977. For the same period, the estimated life expectancy in Irian for men was 51 years and for women 54 years. This is similar to the life expectancies for the whole of Indonesia in 1977. Thus, in the Indonesian context, the IMRs of Irian Jaya do not differ. Hill (1994, p. 141) published IMRs of Indonesia by province, which are based on the 1990 population census. These figures show that in the case of Irian Jaya, the IMR dropped from 111 during the late 1960s to 79 during the late 1980s. For the same period, the IMR for the whole of Indonesia dropped from 132 to 69. The late 1960 estimates are based on the 1985 intercensal survey, while the estimates for the late 1980s are based on the 1990 population census. With regard to these figures it can be concluded that the IMR of Irian Jaya was in the past not as high as that of the whole of Indonesia (assuming that the IMRs are not biased), but that Indonesia on the whole shows a more rapid rate of decline compared to the province of Irian Jaya. When comparing the figures with the IMRs of PNG, one can consider the IMR of Irian to be relatively high. Only three years later, in 1980, PNG showed an IMR of 72, a rate which had declined by 46 per cent over the period 1971-80 (Manning and Rumbiak, 1989, p. 105). The data are derived from the Central Bureau of Statistics of Indonesia (cf. Table 4.4).

The most recent IMRs on the part of Indonesia which includes Irian Jaya are presented in the IDHS report of 1995. During the period 1987-1994, the IMRs have declined for the 'Outer

Table 4.4 **The infant mortality rate (per 1,000) for Irian Jaya, the Outer Java-Bali II region, Indonesia, and Papua New Guinea**

	IMR			
Reference period	Irian Jaya	Outer Java-Bali II	Indonesia	PNG
1950	93/230			200
late 1950s	(Vd Hoeven)		175 (U&I)	(Bakker)
1960			127 (UNICEF)	
late 1960s	111 (Hill)		132 (Hill) 140 (U&I)	
1971				134 (Bakker)
1980			98 (Hugo)	72 (Bakker)
1983	101 (U&I)		92 (U&I)	
1987	79 (Hill)	76 (CBS *et al.*)	75 (CBS *et al.*) 69 (Hill)	
1991		66 (CBS *et al.*)	74 (CBS *et al.*)	
1994/5		65 (CBS *et al.*)	66 (CBS *et al.*) 50 (UNICEF)	67 (UNICEF)
1965-'94	70 (Lautenbach)			

Sources: Bakker, 1986b; Van der Hoeven, 1956e; Hill, 1994; Hugo, 1987; CBS *et al.*, 1995; Teminabuan survey 1996; UNICEF, 1997; Utomo and Iskander (in Table 4.4 referred to as U&I), 1986.

NB All the figures presented in Table 4.4 are not based on the same kind of data, nor is the same method of calculation used. This might lead to deviations. Bakker and Hugo used census data, Hill used census data and intercensal survey data, the IDHS used survey data, and Van der Hoeven used data he collected himself. UNICEF and Utomo and Iskander presented estimates of the IMR.

Java-Bali II'[3] region (see Table 4.4). To aid comparison, Table 4.4 presents data on all regions under discussion.

Twins

The birth of twins was hardly ever appreciated in Irian Jaya. There was a custom of killing one or both, as it was believed to be a result of intercourse during pregnancy, which tradition did not allow, or adultery (cf. Miedema, 1984, p. 179). Sometimes the woman even committed suicide if she gave birth to twins because she could not bear the shameful suspicion. Later, Dutch colonial rule and the mission forbade infanticide. It is however likely that the often undernourished mothers simply could not provide enough food for two children at a time, and killing or starving one was the most successful method to ensure survival chances of at least one child. No longer allowed to kill either of these children, some people started to give one of the twins away, for instance to the grandmother. This person took care of the child but as no highly nutritious substitute for breast milk was available, the child often died in the end (Voorhoeve, 1965, pp. 76-77). During the Teminabuan survey we met people who whispered and giggled when multiple births were the topic of discussion, though time was too short to pursue this subject.

5. Data on Indonesia and Papua New Guinea

The infant mortality rate for Indonesia dropped from about 140 per 1,000 live births at the end of the 1960s to just over 100 some ten years later, implying an average annual decline of 3.2 per cent over this period. The estimate of the IMR in Indonesia for 1980 is 98. Though this drop in IMR is a promising sign, still it means that about 10 per cent of Indonesian babies do not live up to their first birthday. When comparing this percentage with other countries in the region, the high level of infant mortality of Indonesia is conspicuous (Hugo *et al.*, 1987, p. 120). Over the period 1980-1994, the IMR however did continue to decrease. For the years 1987, 1991, and 1994, Indonesia showed a drop in the IMR from 75.2 to 74.2 to 66.4 (CBS *et al.*, 1995, p. 138).

With an IMR of 100 per 1,000 live births in 1970 and an IMR of 98 in 1980, one can conclude that Indonesia did not make much progress during the period 1970-80 to reduce mortality in this age group. In Papua New Guinea on the other hand, infant mortality rates declined substantially over the period 1971-1980[4] (census data). The IMR of PNG in 1971 was as high as 134 per 1,000 live births, in 1980 it had already dropped to 72 (Bakker, 1986b, p. 13). Male IMRs were some 12-15 per cent higher than the IMRs for females in PNG

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[3] The outer Java-Bali II region consists of Riau, Jambi, Bengkulu, East Nusa Tenggara, East Timor, Central Kalimantan, East Kalimantan, Central Sulawesi, the Moluccas, and Irian Jaya.

[4] In the 1980 PNG census, infant and child mortality rates are probably underestimated. On the other hand, adult mortality rates are probably overestimated, as they refer to a longer period before the actual census, in which mortality was higher than at the time of the census. The overall level of mortality might therefore be the most realistic estimate of mortality for PNG in 1980, as differences on both sides are levelled out (Bakker, 1986b).

(1971/1980) in spite of one's expectation that female mortality would exceed male mortality because of the Asian preference for males. Because of bride price arrangements, this assumption was found to be untrue for the Teminabuan area.

Ideally, demographers would like to categorize IMR according to endogenous causes (deaths occurring in the first 28 days of life, neonatal mortality) and exogenous causes (deaths occurring from day 29 to 365, postneonatal mortality). No estimates are given by the Demographic Yearbook (United Nations, 1996) for these mortality rates in the case of PNG. Following Bakker's reasoning (1986b, pp. 46-49), it seems likely that 50 per cent of the infant deaths are neonatal deaths and 50 per cent postneonatal deaths. This distribution is based on populations having a life expectancy of between 45 and 60 years. One should however keep in mind that declining (infant) mortality especially affects mortality due to external causes. Consequently, in those cases, the proportion of infant deaths grouped under neonatal mortality will somewhat increase. However, when the level of infant mortality becomes very low like in countries such as The Netherlands (IMR=6/1,000 in 1995; UNICEF, 1997, p. 81), the infant deaths will again be more evenly spread over neonatal and postneonatal deaths. In the case of PNG the IMR is estimated to be 72 per 1,000 live births (based on the 1980 national census), which results in a neonatal and postneonatal mortality rate of 36 per 1,000 live births each (Bakker, 1986b, p. 49). These results should however be read with the awareness that many children who died in early infancy are not reported during the 1980 PNG census.

Tables 4.5 and 4.6 provide figures of both infant and child mortality. Though figures from the Teminabuan study area are not as detailed as those presented in Table 4.5, these figures nicely illustrate Indonesian infant and child mortality over time.

Table 4.5 **Infant and child mortality rates (per 1,000 live births) and the postneonatal to neonatal mortality ratio for three five-year periods preceding the survey, Indonesia 1994**

Years preceding survey	Approx. calendar periods	Neonatal mortality	Postneonatal mortality	Infant mortality	Child mortalty[a] (1-4)	Underfive mortality	Postneonatal /neonatal ratio
0-4	mid-89 mid-94	30.4	26.5	57.0	25.8	81.3	0.87
5-9	mid-84 mid-89	34.3	40.6	74.9	30.4	103.1	1.18
10-14	mid-79 mid-84	37.3	38.0	75.3	37.5	109.9	1.02
0-9	mid-84 mid-94	32.5	34.0	66.4	28.3	92.8	1.05

Source: CBS *et al.*, 1995, p. 137.

[a] For the definition of child mortality, please see Sub-section 4.3.2.

Neonatal deaths are very often either due to causes related to childbirth or to congenital malformations. Neonatal mortality therefore differs less with the educational level of the mother than postneonatal mortality (cf. Boerma, 1996, pp. 207, 218-220). Still, when the mother has completed primary education or more, neonatal mortality drops. On the other hand, during the time of life when external factors are the major cause of death, roughly speaking after one month of life (postneonatal mortality), every increase of the educational level of the mother steadily reduces the mortality rate (CBS *et al.*, 1995, p. 140). Boerma (1996, p. 209) found that child mortality risks were more influenced by access to basic health services than by the educational level of the mother.

Table 4.6 **Infant and child mortality rates by sex (per 1,000 live births) for PNG for 1971 and 1980, and the percentage change during the intercensal period**

	1971	1980	% Change 1971-1980
Deaths M[a]	142	78	-45
before F[a]	125	66	-47
age 1 T[a]	134	72	-46
Deaths M	79	43	-46
aged F	79	41	-48
1-4 T	79	42	-47

Source: Bakker, 1986b, p. 110.
[a] M=males; F=females; T=total population.

From Table 4.6 it is clear that infant and child mortality rates in PNG declined substantially between 1971 and 1980. Notwithstanding uneven quality of data gathering for both censuses and biases in the data, there is no doubt, although some of the decline might be due to a change in data quality, that there has indeed been a considerable decline in infant and child mortality during the intercensal period. Because of these presuppositions, Bakker (1986b, p. 115) considered the change in mortality rates to be maximum estimates of intercensal change.

4.3.2 Child mortality

Child mortality is defined as the probability of dying between exactly age one and age five, while under-five mortality is the probability of dying between birth and exact age five (CBS *et al.*, 1995, p. 135). Data on (a) Teminabuan, (b) Irian Jaya, and (c) Indonesia will be subsequently dealt with.

A. Data on Teminabuan

The Teminabuan survey provides the following figures which are required to calculate child mortality. The number of live births reported is 4,884, 496 of whom died before age five and 154 children died between ages 1 and 4. The probability of dying between age zero and age five (child mortality; ${}_4q_1$) in Teminabuan is 33.9. The Teminabuan survey revealed the

following data on the number of deaths and the distribution of deaths between age zero and age five (Table 4.7).

Table 4.7 **Number of deaths per 1,000 live births and the percentage distribution of deaths for children aged zero to five, Teminabuan subdistrict**

Age	No. of deaths per 1,000 live births[1]	Distribution (%) of deaths between ages zero and five[2]
≥0 and < 1	70.0	68.9
≥1 and < 2	14.1	13.9
≥2 and < 3	7.3	7.2
≥3 and < 4	5.3	5.2
≥4 and < 5	4.7	4.6
Total	101.5	100.0

Source: Teminabuan survey 1996.
[1] Based on children born alive; n=4,884.
[2] Percentage distribution based on children born alive before 01/05/91; number of deaths=496.

The Teminabuan results show a high mortality between ages zero and one (70/1,000 live births), and steadily declining mortality afterwards (Table 4.7). These results are in line with the pattern which is usually found.

Brass (UN, 1983, pp. 73-75) developed a method to estimate child mortality based on the numbers of children ever born and children surviving. To eliminate biasness, application of Brass's method to estimate child mortality should be restricted to populations where fertility and childhood mortality have remained constant in the recent past. From Chapter 5 on fertility we can conclude that fertility in the Teminabuan area indeed has hardly changed in the recent past. Though mortality levels have decreased over time due to improved medical services and living conditions, so far we have no indication that this applies to the Teminabuan area as living conditions have remained fairly constant for the majority of the population. There are different methods to calculate child mortality, different in the sense of type of data used. One method uses data on duration of marriage, while the other method uses the five-year age groups of the mother. Though age reporting is rather poor in Teminabuan coupled with the fact that quite a number of children do not live with their biological mother (see Sub-section 5.4.3 on adoption), the preference is for CEB and children surviving by five-year age groups of mothers instead of duration of marriage, because data on duration are definitely less reliable in the Teminabuan subdistrict. Concerning the input, we have to disregard the estimate ${}_1q_0$, the probability of dying before age 1, as it is based on too small numbers for meaningful calculation. Besides, there is another reason to ignore the estimate ${}_1q_0$. An assumption of Brass's method is that the risk of a child dying is only a function of the age of the child and not other factors, such as the mother's age or the child's birth order. In practice however, it shows that children of young mothers (<20 years of age) face mortality risks well above the average (cf. Sub-section 5.3.1 which discusses high-risk fertility behaviour).

Therefore, mortality estimates based on the reports of women aged 15-19 are usually disregarded.

Table 4.8 shows the application of the Brass method for estimating child mortality on the basis of Teminabuan data. The input data for the calculations are the number of children ever born (CEB) and the number of children surviving (CS) by five-year age groups of mothers (derived from the Teminabuan survey).

Table 4.8 **Probability of dying between ages zero and x ($_xq_0$) based on the Brass method and the Coale-Demeny West model (Trussel regression), Teminabuan 1996**

Probability of dying ($_xq_0$)	Brass method	Coale-Demeny West model
$_1q_0$	[0.088]	[0.225]
$_2q_0$	0.089	0.084
$_3q_0$	0.111	0.114
$_5q_0$	0.120	0.120
$_{10}q_0$	0.129	0.130
$_{15}q_0$	0.110	0.111
$_{20}q_0$	0.144	0.145

Source input data: Teminabuan survey 1996.

The Coale-Demeny West model uses the Trussel regression equation to calculate the probability of dying (United Nations, 1988, p. 47). The Trussel regression is a refinement of the Brass method, for instance it corrects for the bias in the youngest age interval. The estimates using Brass's method (Table 4.8) are fairly congruent with the indirect estimates derived from the Coale-Demeny West model. Thus far official estimates for Indonesian mortality are based on the West model, and it is therefore worthwhile comparing the two. The probabilities of dying according to the Coale-Demeny West model are calculated by the CEBCS procedure of the software package Mortpak (United Nations, 1988, pp. 47-51). The same input data (CEB and CS by five-year age groups of mothers and the mean age at childbearing) are used as for the Brass method. The value of $_xq_0$ grows when the value of x increases. The input data show a drop in the number of CEB and CS in the age group 40-45 (probably due to bias as a result of recall lapse at older ages and/or a (temporary) lower fertility level in the past), which shows in the value of $_{15}q_0$. The probability of dying between birth and age 5 ($_5q_0$) yields an estimate of $_5q_0$=0.120 (based on Brass's method of calculation as well as on the Coale-Demeny West model), which means that out of every 1,000 live births, only 880 live till their fifth birthday. In the case of Teminabuan this means that of the 205 live births reported in 1995, 180 will still be alive when they turn five.

B. Data on Irian Jaya

With regard to child mortality in former Irian Jaya, Van der Hoeven (1956e, pp. 303-308) made to the following assessments:

- After the first year of life, male mortality exceeds female mortality.
- Death rate before the fertile age: the 352 interviewed mothers stated that on average they had lost 46 per cent of their children before the children reached their 15th birthday.
- The death rate of young children is nearly the same everywhere.

The second judgement of Van der Hoeven can be illustrated with Teminabuan data. Irrespective of the age of the mother, and therefore the completeness of her fertile period, the Teminabuan women interviewed in 1996 (n=1,371) had on average lost 11.3 per cent (n=4,884) of their children born alive before they reached age 15. Mothers past their fertile period (women ≥ 50 years of age) had according to the Teminabuan survey lost 8.4 per cent (n=272) of their children before age 15. Under-reporting at higher ages must definitely be relevant, a conclusion reached in Sub-section 4.3.1, which states that, especially at higher ages of the mother, infant deaths are under-reported. Besides, the less 'fortunate' (malnourished, high parity) mothers might already have died at younger ages compared to their more well-off sisters, and are no longer able to report their loss of child.

The six study areas of Dutch New Guinea (Groenewegen & Van de Kaa, 1967) show different age-specific mortality rates which is perhaps partly due to bias in the data gathered (e.g. age misstatement; (sex-specific) under-enumeration of deaths at young age). Through retrospective research, Groenewegen and Van de Kaa were able to estimate age-specific mortality rates. For the period 1920-35, they estimated under-five mortality to lie around 300 per 1,000 live births, a rate which however increased again during the Second World War and the Japanese occupation. The extent to which war actually impacted on the different areas showed in its effect on mortality. The war situation would especially affect infant and child mortality rates, and cause them to increase. After the Second World War, rates dropped to prewar values. Anti-malaria programmes which were started from 1956 onwards, were mainly responsible for decline of infant and child mortality rates in particular (Groenewegen & Van de Kaa, 1967, p. 52). In the research areas under-five mortality may have initially ranged between 200-350, although infant mortality seems to have been extraordinarily high in the area of Nimboran (500-550 per 1,000). These differences can partly be explained by climatic conditions and the quality of available food. Different times in the onset of decline can be explained by the different times health programmes were introduced. Of course climate and health services do not explain every bit of difference in mortality rates found in the six study areas, but detailed information on other interfering factors is not available from this retrospective demographic research. Still, the study gives a good idea of how mortality levels might have been in times before the research was carried out. Another factor which undoubtly influenced the mortality levels in the different areas is the time when intervention from either the Dutch colonial rule or missionaries was made manifest. The provision of services such as roads and health posts benefited the local population. Besides anti-malaria programmes, a mother and child care programme was introduced in the fifties (see Sub-section 3.3.4 for more details).

C. Data on Indonesia

Indonesian child mortality fell between the late 1960s and 1973-74. Based on the 1980 Census, the under-five mortality ($_5q_0$) (termed child mortality by Hugo *et al.*) is estimated to lie between 150 and 160 for the whole of Indonesia (Hugo *et al.*, 1987, p. 121). Compared

with the data of the 1991 IDHS, some remarkable developments can be observed with regard to infant and child mortality (see Table 4.9). The most significant developments are to be observed when looking at mortality by the age of the mother at time of birth. First, neonatal mortality among mothers below 20 years of age dropped from 59.8 to 44.4 per 1,000 between the 1991 IDHS and the 1994 IDHS. Second, post-neonatal mortality in the youngest age groups of mothers dropped from 53.5 to 42.3 per 1,000. Third, among the same age group of mothers (<20) infant mortality showed a decline from 113.3 to 86.8 per thousand. Fourth, the child mortality rate dropped most in the oldest age group (from 49.4 to 25.9 per 1,000), whereas under-five mortality decreased significantly in the youngest (<20) and the oldest (40-49) age groups of mothers (from 147.4 to 114.0 and from 120.5 to 96.4, respectively).

As can be read from Table 4.9, the age of the mother at time of birth clearly affects under-five mortality. Children of very young and relatively old mothers have a bigger chance of dying than children whose mothers are aged 20-29. For postneonatal and child mortality the pattern

Table 4.9 **Infant and child mortality by biodemographic characteristics, Indonesia 1994 (IDHS)**

Biodemographic characteristics	Neonatal mortality	Post-neonatal mortality	Infant mortality ($_1q_0$)	Child mortality ($_4q_1$)	Underfive mortality ($_5q_0$)
Age of mother at birth					
< 20	44.4	42.3	86.8	29.8	114.0
20-29	28.4	31.8	60.2	27.3	85.8
30-39	33.4	33.9	67.2	29.9	95.1
40-49	42.1	30.3	72.4	25.9	96.4
Birth order					
1	29.9	29.8	59.7	21.8	80.2
2-3	29.9	29.8	59.7	23.7	81.9
4-6	34.1	38.6	72.7	33.4	103.7
7+	46.9	52.1	98.9	54.1	147.6
Previous birth interval					
< 2 years	57.2	60.4	117.7	46.2	158.4
2-3 years	27.8	35.3	63.1	31.9	93.0
4 years or more	24.2	18.4	42.6	15.6	57.5
Size at birth[a]					
Very small	(238.9)	18.7	257.6	(67.8)	308.0
Small	50.7	42.8	93.5	31.0	121.6
Average or larger	22.4	22.4	44.8	21.3	65.1
Don't know	84.3	75.4	159.6	57.2	207.7

Source: CBS *et al.*, 1995, p. 141.

[a] The figures are for the 5-year period preceding the survey.

Note: The approximate calendar period covered is mid-1984 to mid-1994. Figures in parentheses are based on 250-499 births.

is however somewhat different. Postneonatal mortality is highest among mothers under age 20, but quite similar for the remaining age groups. The level of child mortality hardly differs by age of the mother. Postneonatal and child mortality do not increase in the highest age groups. When birth order is related to under-five mortality, one finds that between birth orders 1 and 2-3 mortality remains stable. After birth order 3, mortality for all indicated groups increase significantly. The figures in Table 4.9 show the well-known pattern of high mortality of children born less than 2 years after the previous birth. Infant mortality declines considerably as the intervals between births increase. Altogether one can state, as will also be discussed in the chapter on fertility, that children face an elevated risk of dying when their mothers are either very young or relatively old at time of birth, where high parity births, or rapid birth succession are concerned (CBS *et al.*, 1995, p. 142). Health programmes should therefore be directed at avoiding such high-risk behaviour and at the same time be able to deal with elevated risks.

4.3.3 Mortality at other ages

Here, mortality is defined as the probability of dying at age 5 (or 10 or 15) and over. Usually it is expressed in five (or more) year groups. A measure which can be used to express mortality at age 5 and over is the age-specific death rate (ASDRs; cf. Sub-section 4.4.1).

Although most areas in former Irian Jaya which were researched by Groenewegen and Van de Kaa show that mortality claims most victims at a young age, the Moejoe area shows a different picture. In this area, infant and child mortality are found to be relatively low (estimated to lie somewhat below 200 per 1,000) and mortality at age 5 and above to be relatively high. The possible explanations for this pattern are that infants and children are comparatively well off in the sense that the lactation period is extensive and suitable food products are available. Besides, the young children are kept warm inside the houses. At older ages, they are more prone to illnesses related to the bleak climate in this area, such as pneumonia and tuberculosis. Malaria is also widespread (Groenewegen & Van de Kaa, 1967, p. 64).

When compared with a General Standard Pattern of mortality (a model life table which assumes that mortality follows a certain pattern, based on observations of groups of countries with similar conditions as found in Indonesia), the Indonesian pattern of adult mortality based on the 1971 and 1980 census, shows a somewhat lower mortality level between ages 20 and 45, and a relatively higher mortality level between ages 45 and 60. According to Hugo *et al.* (1987, p. 123) mortality has declined at a relatively faster pace among young adults as a result of better treatment and control of infectious, parasitic, and respiratory diseases. People in the very young and older age groups remain however vulnerable to diseases related to poverty. Besides, older people still bear the effects of past illnesses prior to the health improvement programmes.

Data on mortality in Indonesia, let alone Irian Jaya, are very scarce. Though age-specific death rates are presented below in Table 4.11 for the province of Irian Jaya, it should be

remembered that these figures are based on a model only and not on vital statistics. The Demographic Yearbook 1994 (United Nations, 1996) gives some crude death rates for Indonesia and PNG. One has however to take into account that because the estimates for Indonesia are based on incomplete data, and it is not known how complete the PNG data is, the figures might not be very accurate. Estimates of the CDR for the periods 1980-85 and 1985-90 are given. The CDRs for the respective periods are found to be 11.2 and 9.4 for Indonesia, while for PNG the CDRs are estimated to be 12.6 and 11.6 per thousand of the population. On the basis of the 1980 PNG census, Bakker (1986b, vii) estimated the CDR for PNG to be 13.2 per 1,000 of the population; 13.7 for males and 12.5 for females. Crude death rates of different regions or periods should however only be compared after standardization for age and sex.

From Table 4.10 it can be seen that already in 1971 women showed somewhat lower mortality rates compared to males. In all age groups, women showed slightly higher rates of mortality decline over the period 1971-1980.

Table 4.10 **Life table probabilities of dying in specified age groups by sex, Papua New Guinea 1971 and 1980, and the percentage change during the intercensal period**

Age group		Males	Females	Total population
5-19	1971	.093	.087	.090
	1980	.058	.051	.055
	% change	-38	-41	-39
20-49	1971	.381	.364	.371
	1980	.289	.266	.279
	% change	-24	-27	-25
50-69	1971	.682	.672	.676
	1980	.645	.625	.636
	% change	-5	-7	-6

Source: Bakker, 1986b, p. 117.

4.3.4 Maternal mortality

The best measurement of maternal mortality is to divide the number of maternal deaths by the number of women of reproductive age, i.e., the population at risk to child-bearing. This is called the true maternal mortality rate. Sometimes the number of maternal deaths is divided by the number of live births, which is then called maternal mortality ratio (MMR) but in practice, even this is sometimes called a rate. The maternal mortality ratio expresses the maternal deaths per 100,000 live births (or per 1,000 or 10,000) (WHO, 1991, p. 18). The WHO (1991, p. 17) defined maternal death as a death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes. In order to be able to measure maternal mortality with some

precision, large samples are needed, which makes household surveys less suitable as an instrument to gather this information as they would be too expensive. Household surveys are however a rich source for background information concerning maternal deaths. Because of its relatively small number the Teminabuan survey does not allow for an estimate of the MMR.

Besides measuring maternal mortality using data sources such as civil registration, censuses, or surveys, maternal mortality can be estimated indirectly. Age-sex specific mortality rates for the reproductive ages might indicate high maternal mortality in the event that female death rates exceed male death rates. Unbalanced population sex ratios can also be indicative of excessive female, and therefore maternal mortality. These findings should however be carefully dealt with before drawing firm conclusions. Additional information in these cases is needed to support the proposition of excess maternal mortality. Thus, additional information on sex differences in other confounding factors like migration and under-reporting of births and deaths is necessary (WHO, 1991, pp. 23-24). Another indirect technique, networking, is mentioned by the WHO (1991) as very useful for assessing maternal mortality, especially in geographically well-defined areas. With this kind of technique, the women interviewed are asked if they know of any woman who has died from maternal causes in the preceding year. The answers from all women interviewed are put together and the deaths identified are followed up in order to gain insight into the circumstances under which the death happened. The number of births to relate the figure to is obtained from the household survey (WHO, 1991, p. 21). Still one needs large samples to be able to retrieve sufficient cases for statistical analysis. Considering time restrictions and limited numbers, it was not possible to apply this method during the Teminabuan survey.

To put maternal deaths in global perspective, in Asia maternal deaths account for 21-46 per cent of all deaths to women of reproductive age, compared to less than 1 per cent for the United States. The maternal mortality ratio for The Netherlands is estimated to be around 10 per 100,000 live births. The overall MMR for the developed countries is estimated to be about 30 per 100,000 (WHO, 1991, p. 5).

It is estimated that in some 10 per cent of all pregnancies complications develop. This percentage is expected to be even higher among deprived populations which, without sophisticated medical help, would lead to death of the mother and/or child. Though figures about antenatal care in developing countries indicate a level of medical supervision during pregnancy, this does not guarantee adequate follow-up and treatment of difficult cases. Besides, one should also take into account the quality of the antenatal checks themselves, i.e. the nature of such a check-up and types of readings taken in cases of complications. Information on antenatal care received in Teminabuan subdistrict, Irian Jaya, and Indonesia is presented in Sub-section 5.4.2.

Figures for the whole of Indonesia indicate that the coverage rate of prenatal care is 49 per cent in 1989. The maternal mortality rate (MMR) of Indonesia is estimated to be 650 (per 100,000 live births) in 1990 (UNICEF, 1998, p. 119). MMR estimates based on other sources range from 80 nationally (1980, WHO/UNFPA) to more than 1,000 in South Sulawesi (1978-

80). The WHO (1991) only gives more details on maternal deaths for the provinces of Bali (1980-1982) and Central Java (1986-1987). The WHO classification of maternal deaths by cause clearly indicates that most deaths (70-80%) are due to direct obstetrical and postnatal causes, especially haemorrhage which is responsible for 46 per cent of all maternal deaths in both provinces. Sepsis is another serious cause of maternal death (10-20%; cf. Grace, 1996, p. 147).

Different sources report different MMRs for PNG. One of these sources, the Economic Commission of Asia and the Pacific, estimated the MMR to lie between 700 and 1,000 per 100,000 live births in 1982. Two years earlier the WHO estimated the MMR to be 900 per 100,000 in PNG nationally. In areas with well-established obstetric services, the MMR was still as high as 460 (1977-1983). For the period 1984-86 Mola (1989) estimated the MMR for PNG to be about 700 per 100,000. As in Indonesia, the bulk (85% in 1984-1986) of female deaths are ascribable to direct causes.

4.4 Mortality patterns

Populations at a certain stage of development can be grouped by their life expectancies. Populations of the same group show a pattern of mortality by age and cause, which usually is very similar. Models of age-specific (e.g. Coale and Demeny) and cause-specific (e.g. Preston) mortality have been developed to chart these patterns. Comparing the specific mortality patterns of a population under study with a general (regional) pattern brings deviations quite easily to light, which might indicate specific local conditions influencing specific age groups or causes of death.

Age- and sex-specific death rates are calculated for the Teminabuan research population. The results are compared with data concerning Irian Jaya, Indonesia, and PNG (Sub-section 4.4.1). Although it was mentioned at the beginning of this chapter that the number of deaths by age derived from the Teminabuan survey was too small to use as a basis for life table calculations, we took the challenge to give it a try (see Table 4.12). We limited ourselves to ages up to 15, as the numbers of deaths beyond that age are really too limited for the calculation of ASDRs. Sub-section 4.4.2 discusses the causes of death for the Teminabuan area and compares the results, as far as the data allow, with figures for Indonesia and PNG.

4.4.1 Age and sex-specific death rates

Age-specific death rate (ASDR) is the number of deaths occurring during a specified period to persons (usually specified by sex) of a specified age or age group, divided by the number of person-years lived during that period by the persons of that age or age group. When an age-specific mortality rate is calculated for a calendar year, the number of deaths to persons of the specified age is usually divided by the mid-year population of persons of that age. Age-specific mortality rates are generally denoted by ${}_nM_x$, the annual death rate of persons aged from x to x+n (United Nations, 1983, p. 302).

In the Teminabuan survey, the age at death was calculated as follows. If the exact date of birth (day, month, and year, or month and year) and exact date of death were given by the respondent, the exact age was calculated. For those persons of whom only the year of birth and/or death was given, they were regarded to be born or have died in the middle of the year (June 30th). In such a case the year of birth was subtracted from the year of death. For children of a young age for whom the exact date of birth and/or death were unknown, we tried to estimate their age (in months) at time of death.

When interpreting data on population death rates, it is important to include other population characteristics. For example, a population with a relatively high infant and child mortality, but with a relatively low fertility and consequently an age structure which is narrow at the base, will have a relatively small proportion of all its deaths in the younger age groups. On the other hand, a population with a relatively low infant and child mortality, and relatively high fertility and because of this, an age structure which is very broad at the base will still have a relatively large proportion of its deaths in the youngest age groups (Bakker, 1986b, p. 105).

Two methods are used to calculate the ASDRs. First, the Coale and Demeny West Model Life table is used (see Table 4.11). This method is selected as it is used by the Indonesian Demographic Institute to calculate ASDRs. The model only requires the infant mortality rate as input, which means that no vital statistics are involved. For Teminabuan, the IMRs by sex are estimated from the 1996 survey, whereas the IMRs of Indonesia are taken from the IDHS report of 1995 (p.141). The ASDRs are calculated with the MATCH procedure of the software programme Mortpak, a common method used in Indonesia. Recent ASDRs for the province of Irian Jaya are taken from the Indonesian Demographic Institute (1997, p.3). It concerns a scenario for 1990-1995, which is, again, based on the Coale and Demeny West Model Life table. As the same method of calculation was used, the ASDRs of Teminabuan can easily be compared with those of Irian Jaya and Indonesia.

Next to the Coale and Demeny West Model Life table, the actuarial method is applied to calculate ASDRs for Teminabuan (see Table 4.12). With this method, ASDRs are calculated on the basis of the number of live births (n=4,884) reported by the ever-married women, together with the reported number of deaths. 'Censoring' refers to children who are known to have reached the beginning of a specific age group, who are still alive at the time of the survey, but it is uncertain whether they will live till they reach the next age group. It is assumed that they, on average, stay for half a year in that particular age group. Therefore, the number of censored children is multiplied by 0.5. The ASDRs are calculated by dividing the number of deaths of a specific age group by the number of person-years lived by children of that age group. The number of deaths are multiplied by 0.3 (in age group 0-1) or 0.5 (all other age groups) as infant deaths tend to occur closer to age zero than to age one, and they are therefore estimated to live on average for about 0.3 years. At all other ages the deaths are expected to be randomly distributed over the age group and as a result, the persons concerned live on average for half a year (Namboodiri & Suchindran, 1987, pp. 21-22). The formula used to calculate the ASDRs is therefore as follows. For the age group 0-1: $ASDR = d_0/(n_1*1 + d_0*0.3 + c_0*0.5)$. The ASDRs of all other age groups are calculated according to the formula: $ASDR_x = d_x/(n_{x+1}*1 + d_x*0.5 + c_x*0.5)$, where n_x is the number of survivors at age x,

d_x the number of deaths between age x and x+1, and c_x the number censored between age x and x+1. The number of survivors is calculated on the basis of the number of live births and the number of deaths by age.

Table 4.11 **Age-specific death rates for Teminabuan subdistrict (1996), the province of Irian Jaya (scenario 1990-1995) and Indonesia (1994); Teminabuan and Indonesian ASDRs are based on the IMR**

	Teminabuan		*Irian Jaya*		*Indonesia*	
Age group	Males	Females	Males	Females	Males	Females
0-1	88.60	65.85	n.a.	n.a.	77.77	61.60
1-4	8.48	7.03	16.70[a]	17.00[a]	6.94	6.34
5-9	2.28	1.88	1.52	1.66	1.96	1.73
10-14	1.70	1.47	1.17	1.29	1.48	1.35
15-19	2.68	2.17	1.95	1.93	2.38	2.01
20-24	3.81	2.90	2.75	2.60	3.37	2.69
25-29	4.07	3.37	2.88	3.04	3.57	3.14
30-34	4.64	3.90	3.27	3.52	4.06	3.64
35-39	5.66	4.59	4.06	4.19	4.99	4.31
40-44	7.40	5.55	5.50	5.13	6.61	5.26
45-49	10.02	7.12	7.91	6.69	9.15	6.83
50-54	14.27	10.00	11.75	9.45	13.23	9.63
55-59	20.53	14.16	17.70	13.51	19.37	13.71
60-64	30.55	21.79	26.92	20.86	29.07	21.15
65-69	45.40	33.86	40.94	32.73	43.59	33.08
70-74	69.16	55.03	63.38	53.46	66.89	53.99
75-79	106.99	88.99	99.38	87.20	103.99	87.67
80+	189.10	173.09	154.11[b]	138.69[b]	185.79	171.86
85+	n.a.[c]	n.a.[c]	269.50	253.05	n.a.[c]	n.a.[c]

Sources: for Teminabuan: the IMRs are taken from the 1996 survey and the ASDRs are calculated with the MATCH procedure of the software programme Mortpak; for Irian Jaya: Indonesian Demographic Institute, 1997, p. 3; for Indonesia as a whole the ASDRs are based on the IMRs presented in the IDHS report of 1995 (p. 141), and calculated with the MATCH procedure of the Mortpak software.

[a] ASDR of age group 0-4.

[b] For the Irian Jaya the data refer to the age group 80-84.

[c] n.a. = not applicable.

The ASDRs calculated with the help of the Coale and Demeny West Model Life table are presented in Table 4.11. When comparing ASDRs of Teminabuan with those of Indonesia it shows that for every age group the ASDRs for Teminabuan, males as well as females, are slightly higher. The ASDRs for the province of Irian Jaya are the lowest among the three, though the female ASDRs seem more in line with those of Teminabuan and Indonesia than the male ASDRs.

The results of the actuarial method are shown in Table 4.12. Because of lack of information on sex, only the ASDRs for the total population can be presented.

Table 4.12 **Age-specific death rates based on the actuarial method, Teminabuan subdistrict**

Exact age	Survivors (n)[a]	No. of deaths (d)	Censoring (c)	ASDR
live births	4,884	342	231	75.51
1	4,311	69	199	16.51
2	4,043	36	202	9.17
3	3,805	26	198	7.04
4	3,581	23	142	6.57
5	3,416	10	168	3.00
6	3,238	8	164	2.53
7	3,066	10	134	3.34
8	2,922	3	144	1.05
9	2,775	5	166	1.85
10	2,604	4	107	1.56
11	2,493	4	148	1.65
12	2,341	6	116	2.63
13	2,219	1	161	0.46
14	2,057	1	125	0.50
15	1,931	2	104	1.06
16	1,825			

Source: Teminabuan survey 1996.

[a] $n_x = n_{x-1} - (d_{x-1} + c_{x-1})$.

When comparing Teminabuan data with PNG data (see Table 4.13) it should first be pointed out that there is quite a large time gap between the two observations. When Bakker (1986b) compared the mortality rates of PNG with other countries in the South Pacific Region, it showed that in fact in the whole region, particularly in PNG, the infant and child mortality rates proved to be relatively low, whilst the adult mortality rates on the other hand were relatively high. According to Bakker, such a mortality pattern is typically found in countries where infant and child mortality decreased very fast due to extended MCH services, immunization programmes, improvement of socio-economic living conditions such as safe drinking water and so on. Besides this, Bakker states that an important factor for PNG's relatively low infant mortality is the fact that breastfeeding is almost a universal practice there (Bakker, 1986b, p. 108).

The 1980 PNG census shows the following pattern of mortality: mortality is very high in early childhood, decreases to very low levels during late childhood, increases gradually after age 20 and increases much faster after age 50. The distribution of deaths over the age groups does not vary much between the sexes. One has however to consider that the age distribution is not necessarily alike for males and females (Bakker, 1986b, p. 96).

Table 4.13 **Percentage of deaths by sex which occurred at specified ages, Teminabuan subdistrict 1996 (n=229) and Papua New Guinea 1980**

	Teminabuan subdistrict			*Papua New Guinea*		
Age at death	Males	Females	Total	Males	Females	Total
< 1	36.1	34.3	35.4	19.2	18.2	18.7
1-4	16.9	14.1	15.7	10.0	10.3	10.2
5-9	6.1	2.0	4.4	3.7	3.6	3.6
10-19	3.8	7.1	5.2	6.5	5.9	6.2
20-29	8.5	13.1	10.5	8.5	8.5	8.5
30-39	4.6	3.0	3.9	7.9	8.4	8.2
40-49	6.1	10.1	7.9	9.3	9.7	9.5
50-59	5.4	7.1	6.1	13.8	14.6	14.2
60-69	9.2	5.1	7.4	13.9	13.9	13.9
70+	3.1	4.0	3.5	7.2	6.9	7.0
Total	100.0	100.0	100.0	100.0	100.0	100.0

Sources: Teminabuan: Teminabuan survey 1996, whose data refer to deaths which occurred since January 1990 and are reported by the households; PNG: Bakker, 1986b, p. 99.

NB The figures presented in Table 4.13 are not standardized for age.

With regard to Table 4.13, the fluctuations over the age groups 20-49 in the Teminabuan data might be (partly) due to the relatively small numbers on which the percentages are based. Considering the time lapse between the data of PNG and Teminabuan (16 years), the considerable higher percentage of infant deaths for the Teminabuan subdistrict is remarkable. The percentage of deaths among children 1-4 years of age also seems somewhat higher in Teminabuan. On the other hand, above age 50, the percentage of deaths for PNG is evidently higher.

Data from a three-year (1982-1984) study undertaken in PNG (Moir *et al.*, 1989) revealed that no significant sex differences in mortality rates were found. This is also illustrated in Table 4.13 for PNG data in general.

4.4.2 Causes of death

When deaths are presented by cause, the death rates are calculated by dividing the number of deaths due to a specific cause of death by the population at risk, usually the mid-year population. This is in the event that a calendar period is taken as reference, but any other specified period can be taken as well.

The major causes of death will be discussed in the following order: (a) Teminabuan subdistrict, (b) Irian Jaya, (c) Indonesia, and (d) Papua New Guinea.

A. Major causes of death in Teminabuan subdistrict
In the Teminabuan survey the causes of death are recorded according to information from the household members, which is usually their personal opinion and not necessarily the opinion of a medical doctor. In many cases there has been no medical treatment prior to death. As a consequence, often only symptoms are given. Using broad categories of causes of death however reduces the chance of misclassification. All causes of death which were given by respondents have been categorized in the seven groups presented below (cf. Table 4.14).

1. Gastro-intestinal diseases: cholera, worms, black diarrhoea, diarrhoea, vomiting+diarrhoea.
2 Respiratory diseases: tuberculosis, pneumonia, cough, other RDs.
3. Other infectious diseases: meningitis, malaria, measles, fever+belly pain, fever+cough, fever+diarrhoea, fever+vomiting, internal fever, unspecified fever.
4. Deaths related to pregnancy and childbirth: pregnant, postpartum problems, died after being born, died during delivery, umbilical cord infection, born too soon, mother had a fall; baby died immediately after birth, mother had malaria, mother had pneumonia, mother ill throughout pregnancy, died whilst in labour.
5. Accident/violence: suicide, accident, jelly fish bite, wound+headache, induced abortion, snake bite, wounds, poisoned by others, burns, stab wound, drowned.
6. Other: vomiting mother's milk, anaemia, vomiting blood, cancer, diabetes, convulsions, not passing stool/urine, boils, vomiting, heart disease, heart failure, kidney problem,

weight loss, nervous disorder, internal pain, paralysis, skin infection, swollen body, yellow body, *suanggi* (sorcery), old age, stopped breathing, wasted body, haemorrhage.

7. Unknown.

Table 4.14 **Percentage distribution of deaths by cause and by age group, Teminabuan subdistrict**

	Deaths among CEB reported by ever married women			*Deaths at all ages since 1990 and reported by households*			
Cause of death	0	1-4	5+	0	1-17	18+	Total
Gastro-intestinal diseases	8.2	17.6	19.3	4.9	10.2	6.6	6.9
Respiratory diseases	12.1	7.4	9.1	17.1	6.8	28.6	19.0
Other infectious diseases	46.5	56.8	28.4	50.0	55.9	11.0	36.2
Deaths related to pregnancy and childbirth (age 0)	7.3	0.0	5.7	3.7	1.7	2.2	2.6
Accident/violence	2.4	7.4	20.5	6.1	11.9	15.4	11.2
Other	9.7	7.4	13.6	8.5	10.2	31.8	18.1
Unknown	13.9	3.4	3.4	9.7	3.4	4.4	6.0
Total	100 n=331	100 n=148	100 n=89	100 n=82	100 n=59	100 n=91	100 n=232
Percentage of all deaths				35.3	25.4	39.2	100

Source: Teminabuan survey 1996.

NB The number of deaths reported among CEB is 630. Combining age and cause of death however reveals 63 missing cases, of which 11 belong to age<1.00, 6 belong to age group 1-4, 46 belongs to age 5 and over. The number of deaths reported among all ages since 1990 is 273. From the 273 deaths, 41 missing cases are found when age and cause of death are combined. The missing cases can not be specified by age.

The percentage distribution of deaths by cause and by age group for the Teminabuan survey population is presented in Table 4.14. The first three columns refer to data from the fertility record, that is the births and their characteristics recorded from ever-married women. From this record those children who had already died at the time of the survey are presented by their cause of death and age. Therefore, the highest age of deceased persons in these first three

columns is about 35 years. Column four, five, and six refer to the deaths which have occurred since 1990 and which are reported by the households. They include persons of all age categories. The final column 'total' therefore refers to the section where all ages are represented (columns 4-6). Hence, the first three columns refer to more historical data compared to the last three columns.

Comparing the more historical data with the data from 1990 onwards some changes in the major causes of death can be observed. For the age group 0-1 it seems that the percentage dying from respiratory diseases increases over the years. On the other hand, the percentage of deaths related to childbirth has decreased among this age group. This might be a direct consequence of increased stress put on antenatal care recently (see also Sub-section 5.4.2). In comparison with the percentage of all deaths which occur in age group 0-1 in Indonesia in 1975 (30.0%, see Table 4.15), the percentage of infant deaths is even still somewhat higher in Teminabuan today (35.3%). Considering the age groups after age one, it seems as if the percentage of deaths due to gastro-intestinal diseases has decreased over time. With regard to the data from 1990 onwards, infectious diseases still contribute substantially to the death toll in Teminabuan subdistrict. Infectious diseases are very often preventable and/or treatable, so here lies an important area for mortality reduction.

B. Major causes of death in Irian Jaya

In 1918-1919 the Spanish flu killed some 18 per cent of the coastal population. Another flu in 1938-1939 caused a 10 per cent mortality. In the intervening years, the population was more or less stable. Although some expected the widespread donovanosis (granuloma venereum) to play a role in the depopulation of the area, improved treatment in 1923-1925 of this disease ensured that depopulation figures were not affected.

In the period after 1950, Groenewegen and Van de Kaa expected the infant mortality to be highly related to the intensity of malaria in an area. Their research did indeed confirm their assumption, though intervening variables (e.g. nutritional situation; the various health programmes which were initiated at the same time) could not be excluded. Therefore, direct causal relationships could not be proved. The impact on mortality of for instance malaria eradication campaigns was directly noticeable, in spite of the incidence of epidemics. Vogel (cited by Groenewegen & Van de Kaa, 1967, p. 68) recorded measles epidemics in 1952, 1954, and 1961. Mortality during these epidemics was not extremely high. Only sometimes did many people die because of an epidemic. The pertussis epidemic of 1954 seems to have taken a lot of lives.

For the general population the Teminabuan survey reports cases of deaths since 1990. The survey assistants and other informants reported one epidemic only, that is the cholera epidemic of 1972. Furthermore, the year 1982 was mentioned as a year with a period of extensive heat. In both years, more people than usual were said to have died. We could however not determine how many, not even roughly.

C. Major causes of death in Indonesia

Data on numbers of death by cause are scarce in Indonesia. Two data sources (one referring to 1975 data, and the other to 1995 data) have been recovered which report the percentage distribution of the underlying causes of death in Indonesia (see Table 4.15). Comparison over time is however difficult as the categories used are dissimilar. For the same reason, comparison with Teminabuan data is complicated. Consequently, comparisons only relate to broad groups of causes of death.

Table 4.15 **Underlying causes of death in Indonesia by broad age groups, 1975 (n=1,818) and 1995 (n=3,351) (in %)**

	1975						*1995*
Cause of death	0	1-4	5-14	15-49	50+	Total	Total
Tuberculosis	0	1	2	15	4	4.7	9.6
Pneumonia[a]	20	15	12	9	13	15.4	n.a.
Infectious and parasitic dis.	8	22	25	10	3	10.2	28.1[e]
Diarrhoea[b]	25	30	15	4	5	15.0	7.4
Infant diseases	35	0	0	0	0	10.5	n.a.
Cancer	0	0	1	5	9	3.5	5.0
Heart disease[c]	0	1	6	11	31	11.0	n.a.
Degenerative diseases	0	0	2	5	6	2.8	n.a.
Complications of childbirth	0	0	0	8	0	1.8	1.9
Traffic accidents	0	0	1	1	0	0.4	
Other violence	1	3	8	15	3	5.4	6.3[f]
Residual[d]	11	28	28	17	26	19.7	n.a.
Total	100	100	100	100	100	100	100
Percentage of all deaths	30	15	6	23	26	100	100

Sources: for 1975 data: Hull and Mantra, cited by Hugo *et al.*, 1987, p. 134; for 1995 data: Departemen Kesehatan R.I., 1997, pp. 105-106.

[a] Includes influenza and bronchitis.
[b] Includes gastritis and enteritis.
[c] Includes vascular diseases.
[d] Includes large numbers of malnutrition-related deaths as well as unspecified causes.
[e] Concerns all infectious and parasitic disease.
[f] Concerns all accidents and violence.
n.a. = not available.

As reliable data on causes of death are very scarce in Indonesia, estimates can only be made by comparison of data from countries with a somewhat similar pattern of mortality and socio-economic structure. On the basis of comparison, Hull and Mantra (cited by Hugo *et al.*, 1987, pp. 133-135) estimated the main causes of death in 1975 to be pneumonia, tuberculosis, diarrhoea, and infectious and parasitic diseases. Though these illnesses are for a large part preventable and/or curable, they accounted for as much as half of the deaths in Indonesia. Child mortality was also for the larger part due to the aforementioned illnesses. The main causes of death found in affluent societies like cancer and heart disease, only account for about 14 per cent (in 1975) of, mostly, adult deaths. Utomo and Iskander (1986, p. 24) state that, with regard to Indonesia, figures for the 1970s show that 45 per cent of all deaths in the age group 0-5 are due to immunizable diseases and diarrhoea. Respiratory infections, particularly influenza and pneumonia, are the next causes of infant and child mortality. Tetanus alone causes more than 40 per cent of the total neonatal mortality. The data in Table 4.15 indicate that in 1975 as well as in 1995, infectious diseases are the major cause of death.

As in the Teminabuan subdistrict, data covering the whole of Indonesia (Table 4.15) also show that for a major part preventable diseases cause the deaths of especially young people. Investment in mortality prevention is therefore for Indonesia the most effective way to reduce mortality. From this standpoint, the emphasis of the government on community health facilities, immunization programmes, and maternal and child health centres can be seen as very good initiatives.

D. Major causes of death in Papua New Guinea

A three-year (1982-1984) study undertaken in a malaria-endemic area of Madang province, PNG, included about 16,500 inhabitants (Moir *et al.*, 1989). The major killers for children below one year of age (excluding deaths in the first month of life) in this study area are: pneumonia (31% of infant deaths excluding deaths below 28 days of age), pyrexia of unknown origin (13%), measles (13%), meningitis (11%), and pertussis (7%). Under-reporting of infant deaths aside, the IMR for this population was calculated to be 45.9 per 1,000 live births, which is consistent with results from the 1980 PNG national census (under-reporting of infant deaths was however also assumed for the PNG census). The main cause of death in the Madang study area (Moir *et al.*, 1989) for children below 10 years of age is acute respiratory illnesses (pneumonia and pertussis), which accounted for 20 per cent of deaths in this age group. For those above 40 years of age, respiratory diseases account for most of the deaths. Within this age group, COLD (Chronic Obstructive Lung Disease) caused 32.5 per cent of all deaths, though pneumonia remains an important cause of death as well (it accounts for 15.5% of deaths for those aged 40+). Diarrhoea, with in total about 4 per cent of deaths, claims its victims particularly at a young age, between ages 1 to 4, and at an old age, above 60 years. The first might be related to the introduction of weaning food. Also pyrexia of unknown origin (PUO) finds its victims predominantly in the young and older age groups.

In total PUO accounts for 7.4 per cent of deaths. Cancer accounts for 6.8 per cent of all deaths, and starts claiming victims primarily from age 20 onwards. Because it was difficult to diagnose cases such as malaria without laboratory results, the death rate due to malaria was

estimated to lie between 4-17 per cent for children below 10 years of age (Moir *et al.*, 1989, pp. 312-313). Maternal mortality in the Madang area was estimated to be 410 per 100,000 live births (Moir *et al.*, 1989).

Summarizing, the leading causes of death for the Madang study area in the period 1982-1984 are:

COLD	18.9%
Pneumonia	17.6%
PUO	7.4%
Cancer	6.8%
Diarrhoea	3.9%
Coma/fever	3.4%
Meningitis	3.2%

These data are based on information given by relatives of the deceased persons, partially supplemented by information derived from health records.

4.5 Life table analysis

Like infant and child mortality, life expectancy at birth is, because of its correlation with several socio-economic factors, an important indicator of the state of health in a country, as well as of the standard of living and the quality of life. Life expectancy at birth expresses the number of years newborn children would live if they were subject to the mortality risks prevailing for the cross-section of the population (UNICEF, 1997, p. 102). Life tables are constructed to calculate (amongst others) the life expectancy. Life tables can be constructed on the basis of vital statistics, that is the number of deaths by age which occurred during a specific period, together with the mid-year population of each age group. If these data are not available or incomplete, the life table for a particular population can also be estimated using a model life table as a reference. The reference model life table commonly chosen is the one which best fits the mortality profile of the population under study. Developing countries, especially those in the tropical regions, for instance show a relatively high rate of infant and child mortality. Below, the life tables or some life table features will be discussed separately for (a) Teminabuan subdistrict, (b) Indonesia, and (c) Papua New Guinea. Then, the results of these three areas will be compared.

A. Teminabuan subdistrict

As already discussed in Section 4.4, the vital statistics derived from the Teminabuan survey are too limited to successfully apply the actuarial method for complete life table calculations. Besides, life tables for Indonesia are constructed with the help of the Coale and Demeny West Model Life table. The use of the same method increases comparability. In Sub-section 4.4.1, the Coale and Demeny West Model Life table is applied to calculate the ASDRs. In this section they are used to make an estimation of the life expectancies for men and women at various ages (see Table 4.16). The life table is constructed in the same manner as for Indonesia by the Indonesian Demographic Institute, that is, with the MATCH routine of the software programme Mortpak. This means that the West Model Life table of Coale and

Demeny is taken as reference. Following the method used by the Indonesian Demographic Institute, the input data is the infant mortality rate by sex. Calculations of the IMRs by sex for the Teminabuan area presented in Sub-section 4.3.1 show an IMR of 83.33 per 1,000 live births for males and 62.72 for females. In Teminabuan infant and child mortality is high. As a consequence, the life expectancy at ages 1 and 5 is higher than at birth.

Table 4.16 **Estimates of life expectancies for Teminabuan, based on the IMR by sex and the West Model Life table of Coale and Demeny**

Age	Males	Females
0	57.1	62.0
5	59.3	62.9
10	55.0	58.5
20	46.1	49.5
25	41.9	45.2
30	37.7	40.9
50	21.7	24.2

B. Indonesia

To date, Indonesia has always based its life table calculations on the West Model Life table of Coale and Demeny because of lack of reliable and complete vital statistics. By using the West Model Life table and data from the 1971 and 1980 Indonesian national censuses, estimates of the life expectations at selected ages are made. The results are shown in Table 4.17.

Table 4.17 **Estimates of life expectancies by sex at different ages for Indonesia, based on the mortality levels of the 1971 and 1980 censuses**

	1971 Census		*1980 Census*	
Age	Males	Females	Males	Females
0	45.0	48.0	50.9	54.1
10	48.7	50.9	51.7	54.1
20	40.5	43.0	43.2	45.7
30	33.2	35.7	35.3	37.9
50	19.2	21.2	20.3	22.4

Source: Hugo *et al.*, 1987, p. 122.

For the period 1985-90 the life expectancy at birth in Indonesia is estimated to be 55 years for males and 57 years for females (WHO, 1991, p. 465). UNICEF (1997, p. 88) presented a time trend for the life expectancies at birth and reports that while life expectancy at birth was merely 42 years in Indonesia in 1960, it had risen to 64 years in 1995 (both sexes combined). From 1985-90 to 1995, life expectancy has increased considerably. Life expectancy by sex in 1995 is 65.8 years for females and 62.1 years for males (UNICEF, 1997, pp. 88, 92).

On the basis of the IMRs presented in the Demographic and Health Survey report of 1995 (p.141), a West Model Life table is selected to calculate life expectancies at various ages for 1994 (see table 4.18). The life expectancies at birth for 1994 are for both sexes three years below the UNICEF estimate for 1995. Regardless of which estimate is correct, life expectancy at birth has considerably increased over the last ten years.

Table 4.18 **Estimates of life expectancies for Indonesia 1994, based on the IMR by sex and the West Model Life table of Coale and Demeny**

Age	Males	Females
0	59.1	62.9
5	60.5	63.5
10	56.1	59.0
20	47.0	49.9
25	42.8	45.6
30	38.5	41.3
50	22.1	24.4

C. Papua New Guinea

Because of the decline in mortality in PNG over the period 1971 to 1980 life expectancy has increased, especially life expectancy at birth, which is a consequence of the substantial decline in infant and child mortality (Bakker, 1986b, p. 120). Table 4.19 presents the life expectancies for PNG in 1971 and 1980, based on census data, for selected ages and the magnitude of change over this period.

On the basis of the 1980 PNG census, life expectancy at birth for the whole of PNG was estimated to be 49.6 years, when both sexes are combined. Life expectancy for males was estimated to be 48.7 years, while for women it was 50.7 years. Life expectancy at birth (for both sexes combined) showed an increase of 9.5 years over a period of less than 10 years (1971-1980). A pattern which is common and which appears in areas of PNG where child mortality is high, is that the life expectancies at age 5 are higher than at birth.

Table 4.19 **Average life expectancy at birth, at age 5 and age 25 (in years) by sex for PNG in 1971 and 1980 and the percentage change during the intercensal period**

Average life expectancy		Males	Females	Total population
At birth	1971	39.6	41.1	40.4
	1980	48.7	50.7	49.6
	% change	+23	+23	+23
At age 5	1971	45.4	46.3	45.9
	1980	50.2	51.5	50.8
	% change	+11	+11	+11
At age 25	1971	31.2	31.7	31.5
	1980	34.2	35.1	34.6
	% change	+10	+11	+10

Source: Bakker, 1986b, p. 121.

For the period 1985-90, life expectancy at birth for Papua New Guinean males was 53, while for females it was 55 (WHO, 1991, p. 465). UNICEF (1997, p. 88) reports that life expectancy for Papua New Guinea increased from 41 in 1960 to 57 in 1995 (both sexes combined). Life expectancy in 1995 was reported to be 57.8 years for females and 56.1 for males (UNICEF, 1997, pp. 88, 92). UNICEF derived its estimates from the United Nations Population Division.

Comparing life expectancy at various ages of Teminabuan with the most recent data of Indonesia and Papua New Guinea (see Table 4.16, 4.18 and 4.19) leads to the following results. For Teminabuan as well as Indonesia the West Model Life table was used to estimate life expectancy. As the input data only slightly differs, the results consequently are somewhat similar. In general, the life expectancy of Teminabuan males is one year lower than the Indonesian figure, whereas the life expectancy of Teminabuan females is half a year. Life expectancies at birth, age 5, and age 25 in Teminabuan in 1996 are very much different from those of PNG 1980. Of course the time difference plays a role in this matter as well. Over time, the life expectancy for PNG has increased which can very well be inferred from the data presented by UNICEF. Disregarding time, Teminabuan males and females show a strikingly higher life expectancy at all the indicated ages. For women the difference is even bigger than for men (11, 11, 10, and 8, 9, 8 years respectively). When looking at the life expectancy at birth only, the Teminabuan 1996 data can be compared with PNG 1985-90 data. Here, it again shows that the difference between Teminabuan and PNG is bigger than that between Teminabuan and Indonesia (1994). The difference is however about half that compared to PNG 1980 data (4 and 7 years for males and females respectively). A remarkable finding is that when comparing 1995 PNG data with 1996 Teminabuan data, the life expectancies for the Teminabuan males and females are higher (respectively 1 and 4 years) in spite of the earlier and more extensive health services in PNG.

Higher life expectancies at age 5 compared to age 0 (at birth) for PNG are in line with the findings of Teminabuan and Indonesia. When comparing the life expectancy of PNG with those of other countries from the South Pacific Region, the life expectancy of PNG appears to be lowest.

4.6 The influence of socio-economic variables on under-five mortality

Like the model of proximate determinants of fertility dealt with in Chapter 5, Mosley and Chen (1984) made an inventory of various proximate and socio-economic determinants of under-five mortality[5] in developing countries. This means that all social and economic determinants of under-five mortality are supposed to operate through this set of proximate determinants, or biological mechanisms, in order to influence under-five mortality. Unlike the proximate determinants of fertility, not all intermediate variables of under-five mortality are easily determined. In fact, it is a very multidisciplinary set of variables, all having their own measurement methods. Therefore, while Bongaarts and Potter (1983) were able to develop a quantitative fertility model, the under-five mortality model goes only as far as making an inventory of all variables influencing under-five mortality. Because mortality is usually not the result of one single biological event, as conception is, Mosley and Chen were not able to quantify the model.

In the Teminabuan survey information gathering was only possible through questioning and observation, so not every proximate determinant of under-five mortality could be examined. Sometimes however indicators can be used to measure the variable roughly. Some just have to be left out, like microbiological examination of samples of air, water, food, vectors, and other measures of environmental contamination. Still, the remaining indicators do account for a lot of the under-five mortality rates found.

4.6.1 Proximate determinants of under-five mortality

The proximate determinants of under-five mortality, through which all social and economic determinants operate, are grouped by Mosley and Chen (1984) into five categories, to wit:

1. Maternal factors (cf. CBS *et al.*, 1995, p. 140): age, parity, and birth interval (where the length of a birth interval equals the sum of the postpartum infecundable period, the waiting time to conception, the time engendered by intrauterine mortality, and a full-term pregnancy (Bongaarts & Potter, 1983, p. 44));
2. Environmental contamination: air, food/water/fingers, skin/soil/inanimate objects, and insect vectors;

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[5] Mosley and Chen used the term child mortality for what most demographers customarily call under-five mortality. To prevent confusion, we will use the term under-five mortality in such cases.

3. Nutrient deficiency: calories, protein, micronutrients (vitamins and minerals);
4. Injury: accidental, intentional;
5. Personal measures against illness: personal preventive measures, medical treatment.

Subsequently, all five categories will be listed again, and, as far as possible, relevant information on Teminabuan will be presented. This will be followed in Sub-section 4.6.2 by a description of the socio-economic determinants listed by Mosley and Chen, which operate through the proximate determinants to influence under-five mortality. Those items which are part of the determinants of under-five mortality distinguished by Mosley and Chen, but which are already discussed in the Chapters 3 or 5, will only be dwelt upon as far as the information adds to what has already been outlined in the other chapters. Otherwise, only the main findings are presented together with the references.

1. Maternal factors
Age, parity, birth interval, together with the survival status of the previous child, are all measured by means of interviewing. Data on the age and parity are presented in Sub-section 5.3.1. The quality of the Teminabuan data with respect to time of birth of the mother's offspring is insufficient to calculate birth intervals reliably (cf. Sub-section 2.4.2).

Demographic factors such as the age of the mother at time of delivery, the time between the preceding delivery and the present child (birth interval), the birth order, the number of children per women (parity), and the survival status of the previous child are major determinants of the chance of survival of the present child. Being either a very young mother (below 20 years of age) or a relatively old mother (above 35/40 years of age) at time of delivery does increase the chance of complications during pregnancy and childbirth, and consequently increases mortality risks for the fetus or newborn child. At a very young age, uncompleted pelvic growth increases the risk of complications like obstructed labour, and death (cf. WHO, 1991, p. 6). With a short birth interval, the mother's body has had less time to fully recover from the previous pregnancy and lactation period. Besides, this means that the previous born child is still very young and very demanding on the mother's time and resources. Death of the previous child might indicate that the living conditions pose threats for the child's life. The present child is therefore in need of more attention and care.

As has been mentioned before, measurement of reliable birth intervals failed in the case of Teminabuan. From Table 5.12 in Sub-section 5.3.1 we see that young mothers are relatively uncommon in Teminabuan. A relatively high age (>34) of the mother at birth and/or high parity (>3) is however quite common. Some ten per cent of the children born since 1990 have mothers of high age and high parity. High parity occurs in 35.9 per cent of the births in Teminabuan. For Indonesia, these percentages are significantly lower.

2. Environmental contamination
No direct measurement of environmental contamination was carried out. There are however simple physical indexes which are known for their strong correlation with levels of biological contamination of the environment. These indexes are:

a) Intensity of household crowding (no. of persons per room), which indicates the risk of air-contamination and contact-acquired respiratory infections. Crowding is discussed in Sub-section 3.3.1.
b) Source of water supply, which indicates the risk of water contamination. Sources of water supply are described in Sub-section 3.3.2. Almost 80 per cent of the Teminabuan households collect their drinking water from an unprotected source. However, at least half of the households state that they never drink untreated water.
c) Cleaning, cooking, and storage practices can indicate household food contamination. The combination of the climate/supplies/habits ensures that leftovers are usually not stored, apart from roots and sago products. Meat and vegetables are served in such small quantities that usually there are no leftovers and because they spoil very easily and quickly, rotting food can hardly go unnoticed. Also special storage equipment is required to protect prepared food from ants, dogs, and other animals, and most of the village households do not possess such facilities.
d) Absence of latrines or toilets, or the use of soap and water, indicate the possibility of faecal contamination. The presence and use of toilets is discussed in Sub-section 3.3.2. Defecating in or near a water source is common practice in Teminabuan subdistrict. Hands are therefore usually washed with water, though without soap.

Another possibility to assess the relative level of environmental contamination is to record the number of recent episodes (incidence) of acute infectious diseases in the cohort of children under study. Since state of health is not an issue in this research, it has not been included in the Teminabuan survey.

3. Nutrient deficiency
Exact measurement of nutrient deficiency is a very specific (and time-consuming) job, and could therefore not be included in the survey questionnaire. Observation is used as a method to gain information on the diet of the population. As already discussed in Sub-section 3.3.3, the daily consumption of vegetables and especially proteins (fish, meat, eggs, soya products) is limited for most villagers in Teminabuan subdistrict. Heering (1990, p. 26) indicated that the practice of extensive breast-feeding and early weaning has a positive effect on the child's health, and therefore indirectly lowers the under-five mortality.

4. Injury
Although injuries are supposed to be random events, patterns might indicate environmental risks. Injuries resulting in death are brought to light by the question on cause of death of deceased persons in the five years prior to the Teminabuan survey. Although 'injuries' is not very specific, it can be seen as the equivalent of the 'accident/violence' group. Table 4.12 shows that the death toll due to this cause is quite substantial, also in the age group where we usually find young, healthy persons (young adults). In the age group 1-17 for instance about 12 per cent of the deaths is ascribed to accidents or violence.

5. Personal measures against illness
Included in this category are preventive measures individuals take to avoid disease. In relation to child mortality this is measured by antenatal care visits of the mother and assistance during

delivery. During the 1994 IDHS antenatal care was defined as pregnancy-related health care, provided by a doctor, nurse, or midwife (CBS *et al.*, 1995, p. 145). Availability and use of medical treatment in case of illness can be taken into account as well. Antenatal care and assistance during delivery are discussed in Sub-section 5.4.2. Some 61 per cent (n=1,242) of Teminabuan women reported receiving antenatal care during their last pregnancy. This is somewhat less than reported by the IDHS for Irian Jaya and Indonesia. In Irian Jaya, some 77 per cent of the women received antenatal care during pregnancies resulting in a live birth during the last five year preceding the survey. The percentage of antenatal care visits in Indonesia is higher, that is 87 per cent (CBS *et al.*, 1995, p. 147). Correct referral in case of abnormalities discovered was not part of the Teminabuan questionnaire. In Teminabuan confinement often still takes place with the help of untrained relatives (73.9%; n=1,246), which means that there is still quite some room for improvement. Availability and use of medical treatment is already considered in Sub-section 3.3.4. The main findings with regard to Teminabuan subdistrict are that supplies are sometimes meagre and irregular. Besides, medical care by trained medical personnel and medicines are almost exclusively available in Teminabuan town. For many, especially sick people, this is too far away. Finances are also a reason for inadequate treatment of illnesses.

4.6.2 Socio-economic determinants of under-five mortality

Mosley and Chen (1984, pp. 34-41) also made an inventory of the socio-economic determinants, which operate through the proximate determinants to influence under-five mortality. They grouped the variables in three categories, to wit:

1. Individual-level variables, that is (a) individual productivity and (b) traditions/norms/attitudes.
2. Household-level variables, which are determined by income/wealth.
3. Community-level variables, consisting of (a) the ecological setting, (b) the political economy, and (c) the health system.

These variables will respectively be dealt with in the Sub-sections 4.6.2.1, 4.6.2.2, and 4.6.2.3. Again, information will only be presented in as far as it is additional to the information already presented elsewhere in this book.

4.6.2.1 Individual-level variables

The two constituents of the individual-level variables as identified by Mosley and Chen, that is individual productivity and traditions/norms/attitudes, will be dealt with.

A. Individual productivity

Individual productivity is determined by the skills (typically measured by educational level), health, and time of the household members. In this case the product must be seen as the healthy surviving child. When considering parents, it is usually the mothers' skills, time, and health which operate directly on the proximate determinants, whereas for fathers, their educational skills often relate to occupation, and therefore (household) income. Mosley and

Chen consider a mother's education to be of major importance for the child, as it will influence her choices and increase her skills in health care practices related to contraception, nutrition, hygiene, preventive care, and treatment of disease. In addition, the time a mother spends on antenatal visits, attendance of clinics in case of illness of a child or for information sessions, breast-feeding, food preparation, cleaning the child, washing clothes, and looking after the house, will also contribute to the well-being of the child. An example from PNG however shows that increased levels of education, usually accompanied by a modern lifestyle, can also have negative effects on the state of health. That is, modernization can lead to more unhealthy eating habits as is too well known from Western societies such as increased consumption of refined products, fats, alcohol, artificial supplements and, especially, formula milk instead of breast milk for infants (Bakker, 1986b).

In many countries, especially developing countries, one may assume that women who have been to school also know more about child health care, hygiene, and the like, compared to women who have never been to school. As a consequence, under-five mortality is expected to be lower among women who received education. Although this relationship is found to exist (see Table 4.20), one can not conclude that lower under-five mortality rates are caused by female education. As is well known, levels of education are tied with various socio-economic factors, such as source of water supply, type of housing, place of residence and therefore, access to health facilities, etcetera. For the Teminabuan area not too big differences are expected between women according to their educational level. First, the majority (almost 80%) are in a group with an educational level up to primary school. Second, the circumstances under which women in Teminabuan subdistrict live are very much alike. It is more likely that they learn by experience from each other and thus copy each other's behaviour, regardless of their educational level. The largest difference in 'health care behaviour' towards children is expected to be found between the women who live in town and those who live in the villages because of the nearby health centre (and pharmacy) in town and because a substantial number of women in town have a different background (inmigrants) which might be of influence on their health-related behaviour towards children. Data from the 1980 PNG census show that children of women with some or completed primary education have much better survival changes (calculated for children up to two years of age) compared to children of mothers without any schooling. For the whole of PNG 36 (per 1,000 live births) more children survive up to age 2 if their mothers have some or completed primary education. With increasing levels of education of mothers, survival chances increase as well: 63 more children survive to age 2 where the mother has received secondary and/or tertiary education (Bakker, 1986b, p. 17).

Table 4.20 illustrates the important reducing effect education (though including the various associated socio-economic factors) has on infant, especially postneonatal, and child mortality in Indonesia. Comparing Table 4.9 (on infant and child mortality by biodemographic characteristics) of Sub-section 4.3.2 with Table 4.20, education proves to be a far greater stimulus for child survival than demographic factors such as the age of the mother. The effect of extended birth intervals on child survival is however comparable with the effect of education. Hugo *et al.* (1987, p. 131) judged the influence of biological factors, especially birth interval, to be far more substantial than the influence of education on increasing child survival chances. The 1971 Indonesian census data already showed that infant mortality rates

of women without any education is higher (more than twice as high) compared to infants of mothers with secondary education or more. At that time there was however little difference between the IMR of children whose parents had no or only primary education (Hugo *et al.*, 1987, p. 128). As very few Teminabuan women have an educational level at or beyond secondary school, and if they do, they are usually the non-indigenous women, this type of analysis could unfortunately not be carried out for the Teminabuan subdistrict. Interestingly, declines in mortality between 1971 and 1980 proceeded much faster for children whose mother had little or no education compared to those whose mothers had completed secondary education or more (Hugo *et al.*, 1987, p. 128).

Table 4.20 **Infant and child mortality by socio-economic background of the mother, Indonesia 1994 (IDHS)**

Characteristic	Neonatal mortality	Post-neonatal mortality	Infant mortality ($_1q_0$)	Child mortality ($_4q_1$)	Underfive mortality ($_5q_0$)
Education					
No education	38.4	52.2	90.5	44.8	131.2
Some primary edu.	37.6	41.5	79.2	34.3	110.8
Completed prim.edu.	29.0	30.2	59.2	22.3	80.2
Some secondary +	25.2	14.4	39.5	11.6	50.7
Medical/maternity care[a]					
No antenatal(A)/ delivery(D) care	52.4	54.6	107.0	53.5	154.8
Either A or D	25.8	26.0	51.8	22.7	73.3
Both A and D	26.0	12.9	39.0	10.4	49.0
Region					
Outer Java-Bali II	31.8	33.5	65.3	31.8	95.0
Indonesia	32.5	34.0	66.4	28.3	92.8

Source: CBS *et al.*, 1995, p. 140.

[a] Figures are for the five-year period preceding the survey.

NB Approximate calendar period covered is mid-1984 through mid-1994.

Antenatal care (see also Sub-sections 4.6.1 and 5.4.2) has been identified as a variable which indicates whether time was spent by the parent to seek medical assistance during pregnancy in order to increase survival chances of the fetus as well as monitor the health situation of the mother. From Table 4.20 it can be seen how antenatal care services are related to infant and child mortality. Table 4.20 shows that antenatal care and delivery care clearly affect child mortality. When neither kind of care is received by the mother, child mortality is distinctly higher than for the other categories. Women with some secondary education or more tend to seek higher quality health facilities compared to less educated women (CBS *et al.*, 1995, p. 148).

The 1994 IDHS (CBS *et al.*, p. 158) results show that the choice in the type of assistance during delivery is highly influenced by the educational level of the mother. The higher the level of education, the more trained medical assistance is sought. This pattern is most obvious in women with an educational level of secondary school or more. Non-educated women are mainly assisted by traditional birth attendants (77.1%), relatives (10.1%), and midwives (11.3%), whereas 62 per cent of the highest educated category of women choose a midwife, 28.2 per cent a traditional birth attendant, and 7.7 per cent a doctor to assist them. Hardly do they have untrained relatives as their main helper (1.5%). These differences are not only a result of different attitudes among 'educated' and 'non-educated' women, but are also a logical result of the fact that educated women tend to live in urban areas where facilities are more available and accessible. To overcome this difference in accessibility of trained assistance during labour, the provincial government supports a training programme which should supply every village with a trained birth attendant by the end of 1997 (see Sub-section 3.3.4).

B. Traditions/norms/attitudes

Traditions, norms, and attitudes of a society influence economic choices and health-related practices of individuals. The following factors influence child health and child survival:

1. Power relations within the household

In most traditional societies child care is the full responsibility of the mother though she might have little control over the resource allocation and crucial child care issues (e.g. diet, nursing care). Women's education usually changes the power relations within the household. No information on this subject is available from the Teminabuan survey.

2. Value of children

Preference of either sex, as a consequence of the bride price or dowry system, or of status, may result in different feeding and child care practices, which influences the survival chances of a child. Between 1995 and 1996 (Teminabuan survey), boys and girls were born (or at least reported) in the ratio 92:100. If there would be no difference between the death rates of the sexes, males would die at a ratio of 92/192 compared to 100/192 for women. With the 105 deaths of children born since 1990 as reported in the survey, this would then have resulted in 50.3 male deaths and 54.6 female deaths. In reality, a male excess death rate is found of 57.1 over 42.9 per cent, that is 60 male over 45 female deaths. Though there is reason to believe that there is some preference for female children over male children because of the bride price system, it can not be concluded from the figures presented above that children are treated significantly differently because of their sex. All the more so because a small male excess mortality in the youngest age group is found to be a common phenomenon worldwide.

3. Beliefs about causes of disease

Traditional beliefs about causes of disease influence behaviour which has an impact on the proximate determinants of child survival. It for instance influences the choice of health practitioner in case a child falls ill. Though there were no questions included in the Teminabuan survey on this topic, it certainly is not uncommon that illnesses are ascribed to *suanggi* (witchcraft) or spells cast by others, for which modern medicine has no answer.

4. Food preferences

The maternal diet during pregnancy and lactation, as well as the habits of breast-feeding and supplementary feeding, clearly influence child survival. This topic has been discussed in the

Sub-sections 3.3.3 and 5.3.4.1 as well. Food taboos during pregnancy and after confinement are discussed in Sub-section 5.4.2. Teminabuan data show that breast-feeding is common practice and is sustained on average for about 24 months. Besides, supplementary food is introduced at an early age, on average when the child is 3.2 months. Heering (1990) contends that such a feeding combination boosts a child's survival chances.

Bakker (1986b, pp. 130-131) reasoned that in PNG the relatively low rates of infant and child mortality on the one hand and the relatively low fertility rates on the other hand are linked by the traditional custom of child spacing. In the past, sexual abstinence was practised at least during the period of lactation but often far beyond this period, even up to 3 years. And although this traditional practice has diminished somewhat because of modernization, it still is probably an important explanation for the relatively low rates of fertility and infant and child mortality found in PNG. Spacing of children logically results in less than the maximum possible number of children. More time in between pregnancies gives the mother's body time to recover from pregnancy and lactation, as well as the opportunity to devote more time and care to the young child. Spacing of children is a practice which is also found in Teminabuan. Protracted breast-feeding and taboos on sexual intercourse while the woman is still breast-feeding (cf. Sub-section 5.3.4) together with their travelling lifestyle as foragers and their traditional ideas on family planning, resulted usually in some 2-4 years between two consecutive births (cf. Sub-section 5.3.5). The relatively low level of infant mortality compared to adult mortality in PNG is according to Bakker (1986b, p. 131) largely due to the almost universal practice of breast-feeding.

The choice of place of delivery is influenced by traditions, decision making on child care practices, trust in traditional or modern delivery methods or just simply the familiarity with one of the methods. The place of delivery of Teminabuan women during their last childbirth is described in Sub-section 5.4.2, where the main finding is that most of them delivered at home (86.8%; n=1,232). Another 7.8 per cent delivered at the health centre of Teminabuan, 3.2 per cent delivered in a Sorong hospital, 1.6 per cent chose their garden (house) as place of confinement, and only 0.6 per cent the *posyandu*. The main reason for delivery at home is because it is common practice. However there is a fear of going to the health centre where women have to leave behind their traditions and therefore familiarity, and also because of the costs and the inconvenience. Just consider the fact that with the onset of labour it is already too late for women from the (far away) villages to walk all the way to Teminabuan town. As the women usually do not know when the baby is due, how would they know when to go to Teminabuan? Even without being in the throes of labour, the trek from their village to Teminabuan town is extremely trying for a nine-month pregnant woman. The current training programme involving a TBA for every village, whereby the TBA should preferably come from that village, has the major advantage that the pregnant women and the TBA share the same cultural background. A village midwife is within reach and thus, not expensive. In case of high-risk pregnancies, the TBA might be more successful in persuading the woman to seek professional care during delivery in a hospital or health centre. To be present in the health facility at the time confinement starts is important because by the time delivery begins, it usually takes a long time before medical treatment is sought, which can be fatal (cf. Alto *et*

Table 4.21 **Percentage distribution of live births in the five years preceding the IDHS by place of delivery, according to background characteristics, Indonesia 1994**

Characteristic	Private home	Hospital	Health centre/ clinic	Other/ missing	Total
Mother's age at birth					
< 20	86.3	4.8	8.7	0.1	100.0
20-24	76.0	9.5	13.8	0.5	100.0
25-29	71.7	13.9	14.1	0.4	100.0
30-34	76.2	11.8	11.2	0.6	100.0
35+	80.2	10.1	9.2	0.5	100.0
Birth order					
1	70.0	14.8	14.5	0.5	100.0
2-3	75.0	11.0	13.6	0.4	100.0
4-6	84.1	6.8	8.5	0.5	100.0
7+	88.8	4.2	6.6	0.3	100.0
Residence					
Urban	43.1	25.9	30.4	0.5	100.0
Rural	89.5	4.7	5.2	0.4	100.0
Education					
No education	93.5	2.0	3.4	0.9	100.0
Some primary	89.5	3.7	6.4	0.3	100.0
Completed primary	83.1	5.3	11.3	0.3	100.0
Some secondary +	49.1	27.3	23.1	0.4	100.0
Antenatal care visits					
0	97.2	0.8	0.5	1.4	100.0
1-3	91.1	3.7	5.0	0.2	100.0
4+	66.2	15.7	17.8	0.2	100.0
Total	76.8	10.6	12.2	0.5	100.0

Source: CBS *et al.*, 1995, p. 156.

NB The category 'private home' includes the respondent's home and other homes. The category 'hospital' includes government as well as private hospitals; the category 'health centre/clinic' includes government health centres and delivery posts and private clinics as well as midwife's home. The category 'other/missing' includes other private and missing cases.

al., 1991). In this way trained medical assistance during delivery would be guaranteed for a much larger number of women. This would benefit mother and child. During the survey in one of the Teminabuan villages we came across a case of obstructed labour. Also in this case it resulted in the death of both the woman and the child. Trained medical personnel and

equipment were not available in the village and the woman was taken to town too late. As a consequence the woman died halfway between her village and Teminabuan town.

The 1994 IDHS shows the relation between the place of delivery and various background characteristics such as the mother's age at birth, child's birth order, place of residence, level of education, and number of antenatal care visits (see Table 4.21). The IDHS data show that mothers aged below 20 or over 35 year, are more likely to deliver at home than mothers in other age groups. Furthermore, high parity births (7+) are more likely to take place at home than births of lower parity. A large discrepancy appears between the rural and urban areas with regard to the place of delivery. Where in urban areas about 37 per cent of the live births take place at home, in the rural areas this is as high as 83 per cent (CBS *et al.*, 1995, p. 156). Education is related to the place of delivery in the sense that uneducated women usually deliver at home (93%). The percentage is somewhat lower for those with only primary education. On the other hand, a deviation is seen in women with secondary education or higher. In this case barely 50 per cent deliver their child at home (see Table 4.21; see also Hugo *et al.*, 1987, pp. 123-128).

Comparing Teminabuan (1996) with Irian Jaya and Indonesia of 1994 with respect to the most common place of delivery it is clear that most women deliver at home. Deliveries which take place at home are 86.8 per cent for Teminabuan (Teminabuan survey 1996), 83.2 per cent for Irian Jaya, and 78.6 per cent for Indonesia (CBS *et al.*, 1995, p. 157).

4.6.2.2 Household-level variables

There is no reliable vital registration system in Indonesia, and extensive and detailed surveys are rare. Therefore, one has to rely on small scale or general surveys. These surveys do yield very valuable insights into the general aspects of the environment in which mortality is determined, but do not allow for studies of for instance time trends in the mortality pattern by causes of death in the different provinces. However, it is known from these general surveys that mortality trends and levels are heavily determined by some basic economic conditions. The level of income strongly influences the living conditions of people and therefore differences in mortality. Being poor in Indonesia usually means lack of food, adequate housing, and sanitation. Consequently the poor are exposed to more health risks than their well-to-do brothers and sisters. Besides, poor people have fewer means to obtain effective treatment once they fall ill. In May 1998 this was sadly illustrated by the dengue epidemic. Every single socio-economic variable, such as quality of housing, is related to a whole range of illnesses. Being poor and exposed to cumulative health risks is the reason why differences in socio-economic status can become serious health hazards (Hugo *et al.*, 1987, pp. 132-133).

Many of the below mentioned variables are related to the income/wealth of the household, which for example can be expressed by the economic activity of the head of the household. From an analysis of the 1980 PNG census it shows that the relation between child mortality and economic activity of the head of the household is much more pronounced than the relation between child mortality and economic activity of the mother. When comparing survival

chances of children in whose household the head has a cash income compared to households without a cash income, it appears that 25 more children (per 1,000 live births) survive up to age 2 in households of the former. Due to the specific composition of the Teminabuan population, where income earners are by majority the non-indigenous population with their different socio-economic background and their relatively high educational standard, this type of analysis was not feasible in Teminabuan. Instead of only considering the household income level and its relation to under-five mortality, proximate determinants of household income can be used where the economic situation of the household is more adjusted to economic life in areas like Irian Jaya, where subsistence agriculture is still predominant. Cash income is strongly related to education, which has already been mentioned in Sub-section 4.6.2.1 as a major factor which influences child survival. Education in this sense is definitely a confounding factor.

The following variables are identified as proximate determinants of the income/wealth of the household which influence under-five mortality: (a) food, (b) water, (c) clothing/bedding, (d) housing, (e) fuel/energy, (f) transportation, (g) hygienic/preventive care, (h) nursing care, and (I) information. In instances where the subject is dealt with elsewhere in this book, only main findings and/or references will be given.

A. Food: steady availability and quality (cleanliness, freshness, nutrient value)
The issue 'food' is already briefly discussed in Sub-section 4.6.1, as food is identified by Mosley and Chen as one of the proximate determinants of under-five mortality. Though nutritional intake has not been measured, clearly it is influenced by the socio-economic situation of the household. Diet and nutrition are restricted by the local resources and they partially explain mortality differences. There is even evidence that different infant feeding practices in general, and breast-feeding in particular, may explain part of the variation in infant mortality rates. Although nutritional inadequacy is a problem all over Indonesia, this problem is more acute in areas such as Irian Jaya, where sago and cassava are the staples. Especially for infants in Irian Jaya and other eastern provinces, breast milk provides a more complete diet than the readily available staples. Increased risk of infant mortality arises if the mother, especially if she is aged below 20 or above 35, is suffering from poor nutrition and/or chronic untreated infections (Hugo *et al.*, 1987, p. 131). As mentioned before, until age two children are relatively healthy as they are breastfed during their first two years of life. Supplementary feeding and weaning food are however of relatively poor quality as to nutrient value. Freshness and cleanliness are ensured as vegetables are usually collected daily from the garden and food is always cooked before consumption. If there is fish, it is also directly consumed. Only storage and preparation of bigger quantities of meat, such as venison or pork, may be pose problems.

B. Water: quantity and quality
Teminabuan is an area richly endowed with waterways and generally plentiful rainfall. Quantity of water is therefore hardly a problem. Only some coastal villages along the sea arm lack fresh water as their waterways are affected by tides. People are therefore more dependent on rain water or fresh water in their sago fields. Though most (some 80%) households draw water from an unprotected source, contamination is limited due to low population density and

few grazing animals. Besides, the rivers carry running water. Also many households (>50%) boil drinking water, especially when they are in the village (cf. Sub-section 3.3.2).

C. Clothing/bedding as protection against skin infections and parasitic infestations
It is obvious that clothing protects the body from, amongst others, insect bites. However, there is also a study which reveals that the introduction of sheets for bedding brought along an increase in the prevalence of respiratory diseases. In Teminabuan probably the protective function is most prevalent for the following reasons. Most villagers in Teminabuan do not have sheets. They either wrap themselves in a piece of cotton which they also use during their daily bath, and which is therefore washed regularly, or they just sleep with their clothes on. If they can afford it, and it does have a high priority, people wash their clothes very regularly and thoroughly. People with some cash income buy sheets and sometimes mattresses. In the extremely humid climate of Teminabuan it seems hard to keep mattresses fresh and clean. In fact they become ideal breeding ground for bugs etcetera.

D. Housing: size and quality
In Teminabuan houses are traditionally built of sago ribs (walls), sago leaves (roof), cane or tree bark (floor), and wooden piles are used to construct the frame. 'Modern' village houses have walls of planks which makes them dark and gloomy and more conducive for mosquitos to breed. On the other hand, Indonesian data show that the quality of housing is also a socio-economic factor which differentiates groups in a population having dissimilar mortality levels. Within geographical regions of Indonesia (in 1971 as well as in 1980), people with higher-quality housing showed some 20-40 per cent lower mortality. These results were again more striking in urban than in rural areas. The same pattern holds for ownership of consumer items (Hugo et al,. 1987, pp. 128-130).

E. Fuel/energy
Adequate supply of fuel is required for proper cooking and possible sterilization of items such as utensils and feeding bottles, and to provide warmth. There is usually no lack of firewood, the most commonly used kind of fuel in the villages of Teminabuan subdistrict (see also Sub-section 3.3.1).

F. Transportation
A smooth working transportation system brings market supplies, health centres, schooling, and income-generating employment within reach of all people. Transport is indeed an obstacle for people, both in the sense of the opportunity to sell (fresh) products as well as to buy products other than what they produce themselves to increase the variety and, by that, the quality of their diet. The accessibility of the health centres is discussed elsewhere (Sub-section 3.3.4) and is indeed a problem for the inhabitants of the villages located further away. Primary schools are quite well spread over the whole subdistrict (cf. Sub-section 3.4.1). Income-generating activities are on the other hand concentrated in Teminabuan town, Waigo, and actually, most possibilities are located outside Teminabuan subdistrict, like in Sorong town.

G. Hygienic/preventive care
Hygienic and preventive care concerns the availability and acceptable price of soap, cleaning material, insecticides, vitamins, iron supplements, contraceptives, and preventive services such as antenatal care and immunization. Medical services, including medicines, are available to non-wage workers at a relatively low price of Rp 300 (1996; equal to the price of one bundle of vegetables). Contraceptives are free of charge. If medicines and/or contraceptives need to be bought outside the health centre, for instance when health centre supplies have run out, the prices are however remarkably higher. Soap, insecticides, and other articles are not very expensive, but people need to have surplus cash before spending on such items. For those with a cash income, these articles are affordable.

H. Nursing care
Nursing care pertains to the availability and acceptable prices of physicians, drugs, maternity care during childbirth, and hospitalization. In Teminabuan medical care is available to a limited extent. As discussed in Sub-section 3.3.4, trained medical personnel is highly concentrated in Teminabuan town. However, the scope of health care services offered here is restricted. Surgery, for instance, is not available. (Quick) Transportation to Sorong town for possible necessary treatment requires money (and contacts).

I. Information
Access to information about proper nutrition, hygiene, contraceptives, and immunization, helps to increase the people's awareness. The media such as radio, newspapers, or television is available to only a limited number of households and is therefore of little to no importance for the dissemination of information on health-related topics. In Teminabuan the monthly organized *posyandu* is *the* means of addressing mothers with young children on these topics.

4.6.2.3 Community-level variables

Besides individual- and household-level variables, Mosley and Chen distinguished socio-economic variables at community level, which also operate through the proximate determinants as mentioned in Sub-section 4.6.1 to influence under-five mortality. These community-level variables are identified as: (a) ecological setting, (b) political economy, and (c) health system variables. Though Mosley and Chen categorize a, b, and c as community-level variables, it would be more correct to speak of environmental variables. Ecological variables such as rainfall, temperature and the like, are for instance by no means influenced by the community. But also within the political economy and the health system there are factors influenced by forces which are beyond the community level.

A. Ecological setting
The ecological setting includes climate, soil, rainfall, temperature, altitude, and seasonality. Especially in a subsistence society, these variables strongly influence child survival possibilities. Apart from the fact that these ecological variables affect the growth of crops directly, the ecological setting also influences the possibilities of income-generating activities,

and therefore access to schooling, medical care, and time of mothers. See also Chapter 3 for more details on the ecological setting of the Teminabuan area.

Provincial differences in mortality rates are an outcome of many factors, particularly in a country as huge as Indonesia. Lack of detailed and accurate data however impede analysis of mortality differences at provincial level, though generally one can say that the dissimilarities in historical development and the natural environment, and differential spread of diseases, account for some of the differences in mortality levels found (Hugo *et al.*, 1987, pp. 124-128).

B. Political economy

The political economy influences under-five mortality in an indirect but important way. Resource allocations, transport facilities, irrigation networks, and political security all influence a steady supply of (food) products. Organization of production (communal or individually based), the physical infrastructure (railroads, electricity, water, sewage, telephone), and political institutions (links of local organization with central authority for guidance in implementation of programmes, for instance health action programmes, law enforcement and security) are therefore the variables of influence. Some of these variables have been touched upon in the various chapters of this book, such as the transport facilities, supply of (food) products, physical infrastructure (Sub-section 3.2.3), and health programmes (Sub-section 3.3.4), and we will not elaborate on them once again. Topics such as law enforcement or political security are beyond the scope of this research.

The accessibility of resources is different for rural and urban areas in Indonesia, and this can affect mortality levels. Hugo (1987, pp. 123-128) has tried to estimate the overall differences in mortality levels between the rural and urban areas of Indonesia. Based on analysis of different data sources, like the 1971 and 1980 censuses, infant and child mortality is estimated to be 20-40 per cent higher in rural areas. The widest differences between rural and urban areas in Indonesia with regard to mortality are found on the eastern islands. Here one can find for instance rural swampy areas which greatly differ from urban areas with regard to the availability of health and welfare services.

C. Health system variables

Within Mosley and Chen's model of proximate determinants, the formal health system is considered to operate in the following ways.

1. The health system operates via institutionalized actions, for instance programmes against certain diseases such as malaria or immunization programmes. Implementation of such programmes heavily depend on the allocation of financial means by the (local) government. Furthermore, poor regions seem to be extremely susceptible to corruption involving governmental funds and the realization of the intended programmes is hampered.
2. The health system operates via cost subsidies. Whereas the above-mentioned measure (1) reduces exposure to illness, cost subsidies are intended to change the relative price of health-related goods and services. Its effect on the state of health is therefore much more dependent on the utilization of health services, which in some areas is severely restricted by cultural barriers. The effect of this measure is also dependent on the financial position

and priorities of the government as well as of the individual (household). Besides, health services are not evenly spread over the country. People in scarcely populated areas therefore usually have to make a bigger effort (in terms of money and time) to obtain health services.

3. The health system operates via public information, education, and motivation. Education and motivation programmes can operate at various levels. At governmental level, it can influence the allocation of funds. At institutional level, educational programmes can upgrade the skills of health workers. At individual level, such programmes can enhance the skill and change the attitudes and preferences of nursing personnel.
4. The health system operates via technology. Medical technology (e.g. vaccines, antibiotics, insecticides) can be used to fight specific agents of disease. Again, technology is subject to economic constraints. Moreover, besides benefits (e.g. vaccinations) there are also adverse side effects of, for instance, insecticides. In a country such as PNG, and for that matter also Irian Jaya, malaria is responsible for a large proportion of deaths. Anti-malaria campaigns can have a major impact on mortality at all ages, as is shown in countries like Sri Lanka.

How these health system variables exactly function in Teminabuan subdistrict can not be fully determined, though some of the issues mentioned are touched upon in other sections in this study. Here, it merely illustrates the range of variables which influence child survival to a greater or lesser extent.

An example of Papua New Guinea nicely illustrates how the various household and community variables together strengthen their influence on child health and survival chances. In the period 1971-1980 improvements in the overall level of sanitation and hygiene in many parts of PNG without any doubt contributed to the decline in mortality during these years. An example is that safe drinking water became available to most of the people of PNG. Improvements in health were also due to the increase in primary health facilities, and especially mother and child health services. Besides this, immunization programmes were extended. At the same time, much more medicines became widely available. The use of health facilities was stimulated by and improvement in the transport and communication facilities. Results from the 1980 PNG national census showed that infants and children benefited more than adults from the extended health care facilities (Bakker, 1986b, p. 130).

4.7 Summary

Authorities usually pay quite some attention to the level of mortality as it is known to be closely related to the level of socio-economic development. This close relation prompts many governments to use mortality levels as indicators for planning, monitoring, and evaluation purposes. Of all mortality indices, infant and child mortality are considered the main indicators (of the socio-economic and health status of the entire community and its living conditions). Another reason to take the mortality level as an indicator for socio-economic well-being is that mortality usually responds rapidly to changes in socio-economic circumstances such as sanitation, water supply, or changes in the medical field. The level of

mortality for the Teminabuan subdistrict can be illustrated with, amongst others, 1995 data. In 1995 the number of births among the survey population was 205. The mean IMR over the years 1965-94 is calculated to be 70 per 1,000 live births (cf. Table 4.3). For 1995 this means that of the 205 births, 14 of them will not live up till their first birthday. As under-five mortality is estimated to be 120 per 1,000, this means that of the 205 births of 1995, 180 will survive until their fifth birthday. Under-five mortality for Teminabuan is characterized by decreasing mortality rates with increasing age. Elements which clearly influence the IMR are birth order and birth interval, which is shown by the 1994 IDHS data (cf. Table 4.9). The higher the birth order, the higher the IMR. With regard to birth interval, prolonged birth intervals increase survival chances of the child. Together with the results disclosed in Chapter 5 on traditional and modern contraceptive use, this can be seen as a reason to especially stimulate traditional methods of contraception, as they are customarily used for spacing births. Besides, extended birth intervals automatically reduce the number of offspring. High birth order will therefore occur less frequently.

The mortality pattern is described by age and by cause of death. Comparing the age-specific and cause-specific mortality patterns of the population under study with a general pattern can bring deviations to light which might indicate specific local conditions influencing specific age groups or causes of death. The age-specific death rates (ASDRs) for Teminabuan are estimated using two methods. First, the Coale and Demeny West Model Life table is calculated by using the MATCH routine of the software programme Mortpak. In Indonesia, this is the procedure used to estimate ASDRs. Second, the actuarial method is applied to calculate the ASDRs on the basis of vital statistics. Bearing in mind the limitations of the survey data (small numbers), the ASDRs are only calculated up to age 15 as thereafter the numbers (of deaths) are too small. Both methods have their pros and cons. The MATCH routine has the disadvantage that it only produces estimates on the basis of the IMR by sex. These estimates are however comparable with ASDRs of Indonesia, as they are estimated in the same way. On the other hand, the actuarial method in this case has the disadvantage of being based on small numbers. This easily leads to fluctuations/deviations which are caused by the use of small numbers. The advantage of the actuarial method is that it is based on observed data. Because of the abovementioned aspects, it is difficult to judge which method yields the most reliable results. When comparing the results of these two methods for the youngest age group for Teminabuan, the ASDRs show great similarity. The distribution of deaths (in percentages) over the age groups for Teminabuan, compared with PNG (1980), is much more concentrated at the youngest ages (0-5). As regards the main causes of death in the research area, infectious diseases are indicated as the major killer among all age groups (62.1%) and especially among infants (72.0%) and children and teenagers (72.9%) (cf. Table 4.14). Death related to childbirth is still considerable among infants (7.3%). Accidents and violence account for more than 11 per cent of the deaths (all ages) and become more important at higher ages. The major killers are therefore for the larger part preventable diseases. Also for Indonesia (1995) as a whole infectious and parasitic diseases are the major killer (Departemen Kesehatan, 1997). Again, it seems that with more effort directed at the prevention of infectious diseases, mortality, and with it infant mortality, can be reduced. The example of PNG shows that this is possible, even in such areas which are difficult to access.

Life expectancy at birth and infant and child mortality are, because of their correlation with several socio-economic factors, important indicators of the state of health in a country. Life expectancy at birth expresses the number of years newborn children would live if they were subject to the mortality risks prevailing for the cross-section of the population (UNICEF, 1997, p. 102). Using the MATCH routine of the software programme Mortpak, the life expectancy at birth is for the Teminabuan population estimated to be 57.1 years for males and 62.0 for females (1996). UNICEF estimates the life expectancy at birth for Indonesia at 62.1 years for males and 65.8 for females in 1995. In Indonesia the life expectancy at birth drastically increased from 42 years in 1960 to 64 in 1995 (UNICEF, 1997, p. 88). The life expectancies at birth for Teminabuan and Indonesia do not differ much if estimated on the basis of the IMR by sex and application of the West Model Life table of Coale and Demeny. Only the life expectancy at birth is some 0.5-2 years higher for Indonesia than for Teminabuan. It therefore seems that although some important areas of Indonesia with concern to their population share, such as Java and Bali, do much better with regard to health facilities available and mean level of education, the overall (estimated) life expectancy at birth for Indonesia and Irian Jaya are more or less similar. However, part of this similarity can be ascribed to the model used (Coale & Demeny West Model Life table) as more or less similar input (IMR) will result in quite similar outcomes when it concerns the same region of the world. The fact is that each regional model assumes various conditions to be equal within that region, which in reality may differ more widely.

As health facilities expanded much more rapidly in PNG than in Irian Jaya in the 1970s, death rates, and especially infant and child death rates, were brought down. As a result, life expectancy significantly increased in PNG (cf. Table 4.19). It is therefore surprising that the 1995 UNICEF estimate of life expectancy at birth for PNG was about the same as for the Teminabuan population (males: 56.1, females: 57.8 (PNG), and males 57.1, females: 62.0 (Teminabuan)). The method of calculation may however differ.

Chapter 5 Fertility

5.1 Introduction

Various measures are available to describe the fertility of a population. Some of these fertility measures are crude indicators, while others are adjusted for the age pattern of the population concerned. Some measures should preferably be derived from census data, whereas other fertility measures should preferably, or can only, be derived from survey[1] data. In addition, survey data can be used to retrieve information on variables which influence the course of the fertility process. Summary fertility measures are based on either census or survey data, whereas adjusted fertility measures are based on survey data (Section 5.2). Also based on survey data are variables such as the age at menarche and the age at marriage, which all have an effect on the course of the fertility process. These variables are described in Section 5.3, together with other variables which affect the fertility process derived from various data sources. Some of them constitute the fertility determinants of the Bongaarts model. Though Bongaarts and Potter (1983, p. 78) identified seven proximate determinants of total fertility, their model includes only four main factors, that is marriage, contraception, induced abortion, and postpartum infecundability. Of importance is the concept that changes in these proximate determinants produce changes in the total fertility rate (TFR). The Bongaarts model has been the basis of the World Fertility Survey (WFS) and the Demographic and Health Survey (DHS) which started in the seventies and eighties, respectively. Therefore, application of the Bongaarts model to the Teminabuan data provides the additional benefit that the proximate determinants derived from the model can be compared to the proximate determinants based on the DHS data of Indonesia (IDHS). The way fertility is influenced by socio-economic conditions, practices related to pregnancy and delivery, and the presence and recognition of adoption are discussed in the last section of this chapter (Section 5.4). To put the survey data in a broader perspective, Teminabuan survey data are, as far as possible, compared with data from Irian Jaya, Indonesia, and Papua New Guinea (PNG).

5.2 Fertility measures

The following sections describe the summary fertility measures based on either census or survey data (Sub-section 5.2.1) and adjusted fertility measures based on survey data (Sub-section 5.2.2).

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[1] The Teminabuan survey provides the data to calculate the various fertility measures. Because of missing cases (due to for instance non-response to certain questions), the denominator may differ from the base data even if it concerns the same group of women (or children). Base data are, amongst others, no. of women aged 15-49: 1,499, no. of currently married women aged 15-49: 1,006, and no. of ever-married women (all ages): 1,387.

5.2.1 Summary fertility measures

Data required for the calculation of the summary fertility measures are available from census as well as survey data. Census data have the advantage of providing an overall coverage of the study population, while survey data by definition are based on a sample. Large census numbers lend a higher reliability to the results, though, on the other hand, survey data are usually more detailed. The following fertility measures are defined on the basis of census and/or survey data: the child-woman ratio, the number of children ever born, which is taken as a proxy for the crude birth rate, and the number of children still alive.

5.2.1.1 Child Woman Ratio (CWR)

The CWR is simply based on the age distribution of the population. The advantage of this measure is that data of only one census or survey is required to calculate the CWR. From this it follows that the disadvantage of this measurement is its sensitivity to the age distribution: in case of serious age misreporting, the result will be biased. Besides misreporting of age, the age distribution can also be affected by differential net migration and underenumeration. In addition, CWRs are influenced by differential infant and child mortality as well. Another shortcoming of the CWR is that it is related to only one particular point in time. If the age distribution is not overly biased by the abovementioned factors, the CWR gives some idea of the fertility level of the population under consideration.
The 1996 Teminabuan survey data show the following CWRs:
Children 0-4/Females 15-44: 72.2 (1,006/1,393 * 100);
Children 0-4/Females 15-49: 67.1 (1,006/1,499 * 100);
Children 5-9/Females 15-44: 60.2 (839/1,393 * 100);
Children 5-9/Females 15-49: 55.9 (839/1,499 * 100).

PNG census data, 1980 (Bakker, 1986a, p. 30) show the following rates:
Children 0-4/Females 15-44: 77.2;
Children 0-4/Females 15-49: 70.8;
Children 5-9/Females 15-44: 70.8;
Children 5-9/Females 15-49: 64.9.

Some ten years before, in 1971, the number of children aged 0-4 per 100 women aged 15-49 was found to be 80 in a highland area of PNG (Young, 1987b, p. 324), while the national average at that time numbered 81 (Young, 1987b, p. 331).

Regarding the CWR of children aged 0-4 to women aged 15-49 it can be deduced from the figures shown above that Teminabuan in 1996 is a little below the rate of PNG in 1980. This indicates that the number of children per women is lower in Teminabuan compared to PNG. This can either result from a lower level of fertility and/or a higher death rate among the under-fives in Teminabuan. The number of children ever born (CEB) and children surviving (CS) for both areas (Table 5.1 and 5.4) is quite similar for both areas. In Teminabuan they are just slightly lower. Furthermore, the figures show that, when looking at children aged 5-9,

Teminabuan shows CWRs which are indeed lower, and displays a bigger difference in the figures concerning children 0-4 and 5-9 years than PNG. This could be caused by higher mortality rates in Teminabuan among children aged 5-9 compared to PNG. Keeping in mind the drawbacks of CWRs however, it is unwise to draw firm conclusions based only on these rates.

5.2.1.3 Children ever born (CEB) and children still alive

Another fertility measure which can be derived from census or survey data is the number of CEB, a measure which provides information on the level of the fertility, which helps us understand current fertility. With the calculation of the CEB, allowance can be made for the age of the mothers. A disadvantage is however that not all the women interviewed have passed their reproductive phase.

One faces a number of hitches in the retrieval of birth histories of women. Especially in developing countries, live born children are prone to be underenumerated during the survey or census because of omission in reporting them. This often happens in cases where:
- the child died very soon after it was born;
- children are not currently living with their mother, like children in boarding schools or children given for adoption; and,
- children are born out of wedlock.

Overreporting might occur as well, for instance in areas where adoption is widespread, like in Irian Jaya and PNG, which creates a risk of double counting. The foster mother as well as the biological mother might report the child as her (biological) child. In the survey we asked ever-married women about their fertility history. We stressed the fact that we needed to know the children she had borne, and those who came to her in any other way. Openness on the part of the assistants in discussing this issue, and their familiarity with it, was usually reciprocated with openness as well.

In accordance with the CEB figures in the IDHS report of 1995, we have taken birth histories of ever-married women, as they are the respondents, assuming most births occur within marriage.

Table 5.1 and Table 5.2 present, respectively, the percentage distribution of currently married women[2] and all women aged 15-49 by the number of CEB. The tables show a lower level of fertility in the age group 40-44 compared with the preceding age group. This might be attributable to recall lapse or a lower level of fertility in the past. The latter might be due to a real increase in fertility. This can possibly be explained by improved medical services, prenatal care, and improved nutrition.

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[2] As mentioned in footnote no. 1 above, the number of currently married women aged 15-49 in the Teminabuan survey equals 1,006. Table 5.1 presents information on currently married women aged 15-49 who have reported on their number of children ever born and children surviving. It shows that only 969 women (instead of 1,006) answered these questions, which leave 37 cases of missing data.

Table 5.1 **Percentage distribution of currently married women aged 15-49 by mean number of children ever born (CEB) and surviving (CS), Teminabuan 1996**

Age group	*Number of children ever born*												Total	No. of women	Mean no. of CEB	Mean no. of CS
	0	1	2	3	4	5	6	7	8	9	10	11				
15-19	26.7	53.3	13.3	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	15	1.00	0.93
20-24	14.8	38.1	32.3	11.6	2.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	100.0	155	1.51	1.38
25-29	5.7	17.5	32.5	28.9	10.3	4.6	0.5	0.0	0.0	0.0	0.0	0.0	100.0	194	2.36	2.09
30-34	8.1	6.8	16.9	23.3	22.9	9.7	7.6	3.8	0.8	0.0	0.0	0.0	100.0	236	3.30	2.86
35-39	4.0	6.3	8.1	14.4	18.4	17.2	16.1	6.9	6.9	1.7	0.0	0.0	100.0	174	4.40	3.82
40-44	9.2	7.3	8.3	16.5	15.6	15.6	15.6	7.3	2.8	0.0	0.9	0.9	100.0	109	4.00	3.50
45-49	2.3	7.0	7.0	12.8	18.6	12.8	12.8	17.4	4.7	1.1	3.5	0.0	100.0	86	4.79	4.07
Total	7.8	14.7	19.0	19.0	14.8	9.4	7.7	4.5	2.2	0.4	0.4	0.1	100.0	969	3.20	2.79

Table 5.2 **Percentage distribution of all women aged 15-49 by mean number of children ever born (CEB) and surviving (CS), Teminabuan 1996**

Age group	*Number of children ever born*												Total	No. of women	Mean no. of CEB	Mean no. of CS
	0	1	2	3	4	5	6	7	8	9	10	11				
15-19	26.7	53.3	13.3	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0	250	0.06	0.05
20-24	14.5	37.7	32.7	12.0	2.5	0.6	0.0	0.0	0.0	0.0	0.0	0.0	100.0	264	0.91	0.84
25-29	5.5	18.5	32.0	29.0	10.0	4.5	0.5	0.0	0.0	0.0	0.0	0.0	100.0	259	1.81	1.60
30-34	8.1	6.5	18.3	23.2	22.4	9.3	7.7	3.7	0.8	0.0	0.0	0.0	100.0	291	2.76	2.42
35-39	4.9	6.5	8.7	14.1	17.9	17.4	15.8	6.5	6.5	1.6	0.0	0.0	100.0	198	4.01	3.48
40-44	8.1	8.1	8.9	16.9	16.1	16.1	15.3	6.5	2.4	0.0	0.8	0.8	100.0	131	3.74	3.31
45-49	2.9	6.9	10.8	11.8	17.6	11.8	12.7	16.7	4.9	1.0	2.9	0.0	100.0	106	4.46	3.79
Total	7.8	14.5	19.5	18.8	14.6	9.4	7.9	4.5	2.1	0.4	0.4	0.1	100.0	1,499	2.19	1.92

Besides, the fertility level of the oldest age group is again higher, a likely result of a higher fertility level in the past and/or the fact that childbearing started at a somewhat later age and consequently carried on a little longer. In addition, the older age groups may now show a fertility level which has not yet reached its maximum. At the end of the fertile period, a woman in Teminabuan will on average have given birth to 4.5 children (see Table 5.2). At that stage, 2.9 per cent of the women (Teminabuan survey 1996; n=102) will never have given birth to a live-born child.

For comparison, data on CEB and CS are presented from the IDHS of 1994 (Table 5.3) and the 1980 census of PNG (Table 5.4). Tables 5.1 and 5.3 indicate that although women in Teminabuan start childbearing a little later than their sisters in the rest of Indonesia, when they have reached the age of 20-24 they have already caught up with them. The fact that for all Teminabuan women there is a lower level of fertility found among the youngest age group can very well be explained by their somewhat higher median age at first marriage. The median age at first marriage among women aged 25-49 is 19.0 years in Teminabuan (survey data 1996, n=851), 18.8 years in the province of Irian Jaya, and 18.1 years in Indonesia (CBS *et al.*, 1995, p. 122). What can be seen from Table 5.4 is that the highest age group of PNG shows a lower level of fertility than the age group 40-44. This might reflect a lower level of fertility in the past, or, more likely, be due to recall lapse.

Table 5.3 **Mean number of children ever born (CEB) and surviving (CS), Indonesia 1994**

	All women		*Currently married women*	
Age group	Mean no. of CEB	Mean no.of CS	Mean no.of CEB	Mean no.of CS
15-19	0.10	0.09	0.57	0.53
20-24	0.76	0.70	1.23	1.13
25-29	1.79	1.63	2.11	1.92
30-34	2.88	2.56	3.08	2.74
35-39	3.78	3.34	3.96	3.51
40-44	4.53	3.89	4.75	4.10
45-49	5.04	4.23	5.31	4.47
Total	2.24	1.97	3.06	2.70

Source: CBS *et al.*, 1995, p. 46.

Table 5.4 **Mean number of children ever born (CEB) and surviving (CS), PNG census data 1980[a]**

Age group	*All women*		*Currently married women*	
	Mean no. of CEB	Mean no.of CS	Mean no.of CEB	Mean no.of CS
15-19	0.11	0.10	n.a.[b]	n.a.
20-24	1.04	0.97	n.a.	n.a.
25-29	2.24	2.04	n.a.	n.a.
30-34	3.35	3.00	n.a.	n.a.
35-39	4.29	3.82	n.a.	n.a.
40-44	4.63	4.04	n.a.	n.a.
45-49	4.57	3.91	n.a.	n.a.

Source: Bakker, 1986a, p. 5.

[a] Totals are not available for PNG.

[b] n.a. = not available.

According to Bakker, conclusions drawn by Van de Kaa (cited by Bakker, 1986a, p. 12) on the basis of the PNG 1966 census data are still valid for the situation in PNG in 1980. A lower level of fertility in PNG than in some surrounding countries was ascribed by Van de Kaa to a relative frequent occurrence of recall lapse and interview error in PNG. Furthermore, the postpartum infecundability, arising from postpartum taboos was probably an important factor why the fertility in PNG was lower than in most other Melanesian populations. The influence of postpartum taboos in 1980 is expected to be less than in the past due to the influences of modernization. Recall lapse is considered to have biased fertility rates especially at higher ages during the 1966 as well as the 1980 PNG censuses (Bakker, 1986a, pp. 8-11). During their fieldwork in Irian Jaya, Groenewegen and Van de Kaa (1967, pp. 70-71) came across another type of bias as well which affected fertility rates at higher ages. They found that the field assistants tended to change the age of 'older' mothers to make it more 'suitable', that is to say, if the interviewer questioned the age of the mother because of the large difference between her age compared to the age of her last-born child, she was sometimes assigned the youngest age of the age group the mother was thought to belong to. Besides, there was also the tendency of clustering events which had happened long ago, like date of marriage, birth of first child, etcetera.

The number of CEB per woman varied over the canvassed areas of Irian Jaya during the demographic research held in 1960-1962. The number of CEB recorded by the birth cohorts of 1896-1900 and 1916-1920 range between 4.05 and 7.95 (Groenewegen & Van de Kaa, 1967, pp. 73-74).

5.2.1.3 Crude birth rate (CBR)

In addition to data on CEB and the fertility measures which can be calculated with this data, like the general fertility rate and the age-specific fertility rates, a census or survey can also provide data on the number of births which occurred in a specified period (usually 12 months) preceding the time of enumeration. To calculate the CBR, the number of births is divided by the mid-period (usually mid-year) population. As the CBR is influenced by the age pattern of the population, CBRs of different countries can not be compared just like that.

The CBR of Teminabuan is calculated by dividing the reported live births over the 12 months preceding every interview month (n=193) by the sample population present during the survey. The CBR of Teminabuan 1996 thus calculated is 30.8, meaning that on average 30.8 live-births occur per 1,000 people per year among the study population. The CBR of Indonesia in 1994 is substantially lower, it was 23.3 according to the 1994 IDHS (CBS *et al.*, 1995, p. 40). For the rural areas of Indonesia, the CBR was only slightly higher than the national mean, that is 24.2. Data on PNG show that over the years the CBR has come down from 43.8 in 1966 and 46.0 in 1971 among the indigenous population (Rafiq, 1979b, p. 36; census data) to 34.2 in 1980 (Bakker, 1986a, p. vi; census data).

5.2.2 Adjusted fertility measures

5.2.2.1 Age-specific fertility rate (ASFR)

All the abovementioned fertility measures are dependent on the age structure of the women and the fertility structure. Age-specific fertility rates provide the possibility of differentiating between these two. The ASFRs are rates which express the degree of fertility of women of a specific age or age group. Age-specific fertility rates are calculated as follows: the number of births occurring during a specified period to women of a specified age or age group divided by the number of person-years lived during that period by women of that age or age group. ASFRs are standardized for the age pattern of the population under consideration, allowing a comparison of ASFR data of other areas or countries or other time periods. The ASFRs for Teminabuan are presented in Table 5.5. The ASFRs are calculated by adding the reported live births over the 12 months preceding each interview month by age group of the mother and, consecutively, this number is divided by the number of all or currently married women of that respective age group.

In the Teminabuan survey all ever-married women were asked about the number of children born alive, how many of them were still alive, and how many had already died. After that, these women were asked to provide their complete pregnancy history, starting from the first pregnancy onwards. For every pregnancy the following aspects were recorded: duration of pregnancy in months, pregnancy outcome, whether the birth was single or multiple, the reason for a pregnancy not resulting in a live birth, in case of a live birth - date of birth, whether still surviving, and in case of death - date and cause of death. In addition, questions were asked about the duration of breast-feeding and the use of family planning prior to the pregnancy. Whenever the women showed difficulty in remembering the order of pregnancy (outcome),

the names of the children were listed in birth order to jog her memory. If there was a time interval of, say, more than 3-4 years in between two pregnancies, the interviewer then asked the woman whether or not there had been any pregnancy in between, and a reason for the latter so as to ensure that the pregnancy history would be as complete as possible (cf. Boerma *et al.*, 1996, p. 31). Given the local circumstances where dates and duration are not matters of great importance, it is believed that the level of fertility is quite accurately measured, especially as regards live births, though fertility trends might be somewhat biased. To improve the data on dates of birth and death of their child(ren), use was made of a list of historical events to aid recall (cf. Sub-section 2.3.1). In addition, a comparison was made with fellow villagers or neighbouring children to verify age mates. Sometimes, we referred to age documentation in church registers or on polling lists. Age, in fact, could be deduced from many different facts the respondent mentioned.

Table 5.5 **Age-specific and cumulative fertility rates of all and currently married women, Teminabuan 1996**

Age group	No. of live births 12 months preceding survey	No. of all women at time of survey	No. of currently married women	ASFRs (all women)	ASFRs (currently married women)
15-19	6[a]	250	11	.024	.545
20-24	44	264	136	.166	.323
25-29	49	259	187	.189	.262
30-34	55	291	219	.189	.251
35-39	31	198	167	.156	.185
40-44	7[a]	131	104	.053	.067
45-49	1[a]	106	84	.009	.011
TFR 15-49				3.940	
TFR 15-44				3.893	
GFR 15-44				138	233

[a] = these categories do not meet Spencer's condition of a minimum of 20 births per age category per year (cited by Young, 1987b, p. 320).

NB The ASFRs will in reality be slightly higher as the figures in Table 5.5 only represent live births of ever-married women and therefore leave out children born to unmarried women.

NB The age of women is slightly overestimated as their ages refer to time of the survey.

As in the 1994 IDHS, pregnancy histories were only collected from ever-married women, assuming births outside marriage to be negligible (CBS *et al.*, 1995, p. 39). However, during the fieldwork we regularly came across unmarried women with a child (usually fostered by family). Though by that time there was no opportunity to change the questionnaire any more, and even more importantly, because the subject was regarded as somewhat taboo it probably would have caused much upset if we had checked every single woman in the household about their pregnancy experiences. As such, we did not look into the issue of children born out of wedlock.

The Teminabuan data indicate that the peak of fertility among all women is found in age group 25-34 (Table 5.5). Groenewegen and Van de Kaa's research in the early 1960s show that also at that time, the peak of fertility was found in age group 25-29 (Table 5.6). Indonesian data (Table 5.7) demonstrate that nationally there has only been a recent shift of the peak from age group 20-24 to age group 25-29. Papua New Guinean data (Table 5.8) match the pattern found in Teminabuan as well as Groenewegen and Van de Kaa's research. Focusing only on ASFRs of currently married women in Teminabuan, disregarding age group 15-19 because of the small numbers, we see that within this group of women the peak of fertility is found in age group 20-24.

It is striking that Irian Jaya and PNG data show ASFRs which are relatively evenly spread over the age groups 20-39, while data on Indonesia clearly show elevated rates in age group 20-24 and 25-29, after which the drop in rate is quite sharp and definitely pronounced in age group 35-39.

The general fertility rate (GFR) represents the number of live births per 1,000 women aged 15-44 years. The GFR for Teminabuan (Table 5.5) and Indonesia (Table 5.7) shows that in Teminabuan the rate is considerably higher compared to the national average, namely 138 compared to 101 births per 1,000 women.

The only other data available on ASFRs for Irian Jaya are those from Groenewegen and Van de Kaa (1967, pp. 97-111), which are presented in Table 5.6. Fertility was high for all canvassed areas except Moe-joe.

The data on Indonesia (Table 5.7) show that for all age groups there has been a decline in ASFR over the years, resulting in a lower TFR. Hugo *et al.* (1987, pp. 152-156) also write that fertility has decreased in Indonesia between 1960 and 1980 among all age groups, but proportionally the most among women in the oldest age groups. Actually, fertility reduction has been most substantial among the youngest and the oldest age groups, that is, the age groups which show the lowest fertility rates (caused by a small proportion of married women at young ages, and reduced fecundity at higher ages).

Table 5.6 **Age-specific and cumulative fertility rates for selected parts of Irian Jaya, 1961-62**

Mother's age group	*Age-specific fertility rates*					
	1[a]	2[a]	3[a]	4[a]	5[a]	6[a]
15-19	.1629	.1271	.0772	.1375	.1469	.0430
20-24	.3889	.3534	.3509	.3505	.3281	.2496
25-29	.3750	.3674	.3509	.3752	.3447	.2704
30-34	.3255	.3552	.3062	.3110	.2954	.2045
35-39	.2248	.1989	.1555	.2204	.2038	.1223
40-44	.0692	.0709	.0356	.0638	.0965	.0376
45-49	.0046	.0038	.0011	.0029	.0083	.0016
TFR 15-49	7.75	7.38	6.38	7.30	7.11	4.64
TFR 15-44	7.73	7.36	6.37	7.28	7.06	4.63

Source: Groenewegen and Van de Kaa, 1967, pp. 97-111.

[a] 1=Schouten Island; 2=Numfor; 3=Lower Waropen; 4=Nimboran; 5=Fak-Fak; 6=Moejoe.

Table 5.7 **Age-specific and cumulative fertility rates of Indonesia based on various sources**

Age group	1971 Census	1980 Census	1990 Census	IDHS 1991	IDHS 1994
15-19	.155	.116	.071	.067	.061
20-24	.286	.248	.178	.162	.147
25-29	.273	.232	.172	.157	.150
30-34	.211	.177	.128	.117	.109
35-39	.124	.104	.073	.073	.068
40-44	.055	.046	.031	.023	.031
45-49	.017	.013	.009	.007	.004
TFR 15-49	5.61	4.68	3.31	3.02	2.85
TFR 15-44	5.52	4.62	3.27	2.99	2.83
GFR 15-44				108	101

Source: CBS *et al.*, 1995, p. 40.

The effect of decreased fertility among women 20-39 years of age is however much bigger, as their fertility was initially much higher. It is likely to assume that fertility will continue to decline in future, as the set of values and perceptions of young women nowadays, which has been shown to cause a reduction in the number of children, will continue to affect their fertility behaviour in future. The more so as the government is strenuously advocating families to have only two children. Their slogan is *dua anak cukup* (two children is enough).

Table 5.8 **Age-specific fertility rates[a], Papua New Guinea 1980**

	Age-specific fertility rate	
Age group	PNG total	Rural village sector
15-19	.085	.072
20-24	.220	.211
25-29	.257	.256
30-34	.223	.226
35-39	.166	.171
40-44	.113	.116
45-49	.017	.018
TFR 15-49	5.50	5.35
TFR 15-44	5.42	5.26

Source: Bakker, 1986a, p. vi.

[a] Actually, the rates presented in this table are the three-year moving average rates centred on the year 1978, though it is assumed that fertility did not change substantially between 1978 and 1980.

Due to the problem of underenumeration, it is very likely that the level of fertility in the PNG 1980 census is underestimated (Table 5.8). The pattern of fertility might however be quite accurate, although it is undoubtedly biased to a certain extent, as a result of adoption, age-misstatement, etcetera. Consequently, it can be concluded that although data on fertility are possibly biased because of the above reasons, the pattern of declining fertility in the region is clear.

5.2.2.2 Total fertility rate (TFR)

This subsection will first deal with the different ways the TFR can be calculated, after which the following will be examined: (a) Teminabuan subdistrict in comparison with Irian Jaya and Indonesia; (b) Previous data on Irian Jaya; (c) Irian Jaya and Indonesia: trends in the TFR, and (d) Papua New Guinea.

The total fertility rate is the most important fertility measure, as it is an overall measure of fertility which is not influenced by the age structure of the population. The TFR is the average number of children that would be born per woman is all women lived to the end of their childbearing years and bore children according to a given set of age-specific fertility rates. In fact, it is the sum of all the ASFRs multiplied by the age interval.

If fertility would have been stable over time, the TFR and the number of CEB at the end of the fertility period should be more or less similar. To avoid bias resulting from working with small numbers, which for instance may occur with survey data, Coale and Demeny use a formula to attain a better estimate of the TFR compared to the number of CEB for women aged 45-49 (also called P_7, that is, the average parity per woman in age group 45-49). In such cases, this is considered a better estimate of the TFR compared to the sum of the ASFRs. In the latter case, the information supplied by each cohort is equally stressed regardless of the fact that data supplied for the oldest and youngest cohorts are subject to fluctuations due to the small numbers of women who have given birth recently. The equation to estimate the TFR is as follows: $TFR = P_3^2/P_2$, where P_2 stands for the average parity per woman[3] in the age group 20-24, while P_3 relates to age group 25-29. The method suggested by Coale and Demeny is based on ratios of parities for the main childbearing age groups (Young, 1987b, pp. 343-344). Brass (cited by Bakker, 1986a, p. 13) suggests that P_7 should be increased by ten per cent to obtain a more appropriate estimate of fertility. According to the World Fertility Survey the rate of omission of births is usually less than ten per cent and predominantly occurs in the highest age groups. As Bakker opines that the omission of births have been prevalent in PNG, this justifies the application of Brass's rule of thumb.

A. Teminabuan subdistrict in comparison with Irian Jaya and Indonesia

When applying the Coale and Demeny's formula and Brass's rule of thumb to the Teminabuan data, we obtain TFRs of 3.60 and 4.90 respectively. The TFR as presented in Table 5.9 therefore seems to give us a figure somewhere in between. When applying these formulae to 1994 Indonesia data, the resulting TFRs by far exceed the ones calculated on the basis of the ASFRs; it results in a TFR of 4.21 and 5.54 respectively. Brass (cited by Young, 1987b, p. 325) also suggested the use of the ratio $P_2(P_4/P_3)^4$ as an estimator for the TFR. Application of this ratio yields a TFR of 4.91 for Teminabuan and 5.09 for Indonesia in 1994.

Substantially larger mean numbers of CEB to women aged 40-49 compared to the TFR for the province of Irian Jaya as well as for Indonesia indicate that there has been a marked reduction in fertility over time. Surprisingly therefore is the similarity between the mean number of CEB and the TFR calculated for the Teminabuan subdistrict. From this similarity it can be concluded that fertility in Teminabuan has remained more or less stable over time.

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[3] P_i is obtained by dividing the reported number of CEB to women in age group *i* by the total number of women in age group *i*.

Table 5.9 **Total fertility rate (TFR), percentage currently pregnant, and mean number of children ever born (CEB) to women aged 40-49, by area, Indonesia**

Area	TFR[a,b]	% currently pregnant[a]	Mean no. of CEB to women aged 40-49
Teminabuan subdistrict	3.94[c]	4.88	4.06
Irian Jaya	3.15[c]	6.20	4.88
Indonesia	2.85	4.61	4.76

Sources: Teminabuan subdistrict: Teminabuan survey 1996; Irian Jaya and Indonesia: CBS *et al.*, 1995, p. 45.

[a] Women aged 15-49 years.

[b] TFR calculated from age-specific fertility rates.

[c] Indicates that one or more of the component age-specific rates is based on fewer than 250 women-years of exposure.

One may question whether there actually were reasons to expect fertility to have declined over time in the research area. From Sub-section 5.3.1.2 we see that the mean age at first marriage of women has been quite stable over time. A reduction in fertility could be expected from the introduction of modern contraceptives, though we will learn from Sub-section 5.3.2 that use of modern contraceptives is relatively low, and that they have been only quite recently introduced. Even this limited use of modern contraceptives does not have the reducing effect as might be expected. This is likely to be due to the fact that modern contraceptives have only replaced traditional methods of family planning instead of constituting a totally new aspect of fertility management. Besides, modern contraceptives might have high rates of method failure due to improper use. Sometimes, the use of modern contraceptives has even caused an increase in fertility if compared to couples using reliable traditional methods. This effect is even accentuated by other factors such as the decrease in length of breast-feeding. Furthermore, while the national two-child policy has been generally adopted in many provinces of Indonesia, in Teminabuan the desired number of children is still around four (cf. Sub-section 5.3.2). All in all, although we observe a downward trend in the ideal family size, as younger age cohorts show a desire for fewer children (3.11 children for women aged 24-29 compared to 4.72 for those aged 45-49), it could not be expected that current fertility patterns would have already been influenced to such an extent.

B. Previous data on Irian Jaya

With regard to somewhat older data on the province of Irian Jaya, in the early 1960s Groenewegen and Van de Kaa (1967, pp. 97-111) found TFRs for the areas they researched to range from 4.64 to 7.75, with most areas having a TFR of more than 7.00. The 1971 population census of Indonesia covered only the coastal and generally urban areas in the province of Irian Jaya. The 1980 census consisted in Irian Jaya, as in all other provinces of Indonesia, of a complete enumeration of all people, and a sample census of 5 per cent of the population (United Nations, 1987, p. 19). Similar to the trend for the whole of Indonesia,

fertility declined in Irian Jaya over the period 1971-1980. The annual rate of decline for Irian Jaya was 2.1 per cent. According to UN figures, Irian Jaya showed a TFR of 5.08 for the period 1975-80 (United Nations, 1987, p. 54). The TFRs for the separate districts of Irian Jaya ranged from 4.21 to 6.66. In 1980 the TFR had reached a level of 4.68 for the province of Irian Jaya (United Nations, 1987, p. 21). Based on the population census of 1990, Hill (1994, p. 135) found the TFR for Irian Jaya to be 4.70 over the period 1986-89.

C. Irian Jaya and Indonesia: trends in the total fertility rate (TFR)

According to Hugo *et al.* (1987, p. 153), the TFRs of Indonesia declined from 5.61 in 1967-70 to 4.27 in 1980. Over the same period, they found the TFR of Irian Jaya to have declined from 7.20 to 4.11. When reviewing these figures, it should be kept in mind that the 1971 Irian Jaya census based figures were only obtained from the coastal and urban areas, where changes occur first. Somewhat comparable data are given by Hill and Weidemann (1989, p. 41), who state that the TFR for Indonesia declined from 5.6 in 1967-70 to 4.7 in 1976-79. According to these figures, which are based on information from the Indonesian CBS, the TFR of Irian Jaya dropped over the same period from 7.2 to 5.4. However, one should refrain from drawing firm conclusions on the basis of data, especially those concerning Irian Jaya, because of the problems of sample size and data quality in this area. With respect to all the provinces of the Indonesian archipelago, the following shift is observed. For the period 1967-70 only the province of North Sumatra equals the TFR of Irian Jaya; all other provinces show lower rates. These proportions have changed over time, in 1976-79 half of the provinces show a TFR which is higher than that for Irian Jaya.

D. Papua New Guinea

To put the fertility rates of Indonesia in perspective with figures from countries in the region, data on PNG are displayed. Data of the 1980 census in PNG (Bakker, 1986a, p. 46) show a TFR of 5.4 for the whole of PNG as well as for the rural village sector. When applying the formula suggested by Coale and Demeny ($(P_3)^2/P_2$) to the 1980 census data of PNG, the TFR shows a value of 4.8 (Bakker, 1986a, p. 13). According to Bakker, this estimate is not accurate, but probably more accurate than P_7. Bakker suggests that in such cases we adopt Brass's rule of thumb and add 10 per cent to P_7 in order to obtain an approximation of the level of fertility. If this calculation is applied to the 1980 census data, the TFR becomes 5.0.

The TFR for a study area in the highlands of PNG was 5.01 for the year 1971-72 (Young, 1987b, p. 324). The TFR of the study area of New Ireland (PNG) is however as much as 8.0. Correcting the TFR of the Kainantu area with the Brass method of fertility estimation yields a TFR of 6.46 (Young, 1987b, p. 345). The lower fertility in the highlands compared with the coastal areas is usually ascribed to nutrition and living conditions. Pans (1960; see Chapter 6 on migration) however noted a lower proportion of younger children in the coastal areas compared to the inland, and ascribes this to unhealthy living conditions of the swampy coastal areas.

Similar to the trend observed in Indonesia, fertility also declined in PNG over the period 1964-84. Jenkins (1993, p. 79) states that she can not ascribe this to higher rates of contraceptive use. According to her, the rising prevalence of sexually transmitted diseases may have played an important role in changing levels of fertility. The cumulative fertility of

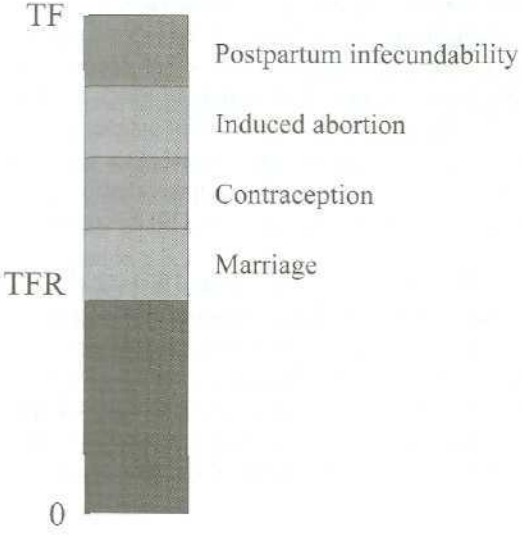
Jenkins's research population declined while family planning acceptance dropped and rates of sexually transmitted diseases increased.

The findings on the TFRs in Teminabuan, Irian Jaya, Indonesia, and PNG can be summarized as follows. The total fertility in Teminabuan has been stable over time. Irian Jaya data show a decline in fertility over time, though this decline is most prominent for Indonesia. The fertility of PNG is also believed to have reduced over time. Here, the decrease in level may however have been caused by a different reason, that is, increased levels of sexually transmitted diseases among the population and concomitant infertility.

5.3 Proximate determinants of fertility

Since the 1950s, researchers have unravelled the variables which determine fertility. It was Bongaarts and Potter (1983) who presented a model (see Figure 5.1) on the proximate determinants of fertility, which are the biological and behavioural factors through which social, economic and environmental variables affect fertility. All these proximate determinants have, to a greater or lesser extent, a direct influence on the course of the fertility process, and it is of importance to realize that changes in these proximate determinants produce changes in the TFR.

Figure 5.1 **Relationships between the fertility-inhibition effects of the four main proximate determinants of fertility and measures of fertility**



Source: Bongaarts and Potter, 1983.

NB: TF = total fecundity, or the number of children a woman is theoretically able to give birth to.

Notwithstanding the fact that Bongaarts and Potter (1983) differentiated seven proximate determinants of fertility, their model for calculating the total fertility rate is based on only four of them. Two criteria are applied to the seven proximate determinants in order to select the variables which are of main interest in studies of fertility levels and differentials. The first criteria is the sensitivity of fertility to variations in the different intermediate variables. A variable has relatively little value if large variations in it produce only minor changes in fertility. The second criteria is the extent of a factor's variability among populations or over time. A relatively stable intermediate variable contributes little to explanation of fertility differentials and is hence less important (Bongaarts, 1982, p. 179). As a result, marriage, contraception, induced abortion, and postpartum abstinence are considered the main determinants of fertility, while natural fecundability, spontaneous intrauterine mortality, and permanent sterility have proven to cause much less variation in fertility and are therefore treated as secondary factors. The seven proximate determinants will be described in Sub-sections 5.3.1 to 5.3.7, starting with the main proximate determinants.

In the last section of this subchapter (Sub-section 5.3.8) the values of the variables of the Bongaarts model will be estimated on the basis of the data found in Teminabuan and, where not available, estimates will be derived from the literature. Ideally, the model should result in a TFR which resembles the TFR found by means of census/survey data. The proximate determinants can then be seen as explanatory variables of the fertility outcome. This can also indicate the way in which fertility is expected to evolve and how it might be influenced, if desired.

5.3.1 Age at menarche, marriage, and first childbirth

In this section the age at (a) menarche, (b) marriage, (c) first childbirth, and (d) high risk fertility behaviour are discussed as the onset of menarche is considered a prerequisite for women to enter into marital union, or at least, the consummation of marriage. To what extent the age at first childbirth is related to the age at marriage in the Indonesian context is considered in Section (c). The age at childbirth is one of the risk factors in fertility behaviour. Logically, the age at childbirth ensues from high risk fertility behaviour. As in practice menarche always precedes marriage and childbirth, it is discussed first.

A. Age at menarche

Although the age at menarche usually does not influence the course of the fertility process, as marriage or entry into sexual union follows only in a few years' time, the age at menarche does play a role in determining the fertility pattern in the Asian region as fertility is not extremely high in the period immediately following first menstruation (Young, 1987b). An explanation found for this phenomenon by different researchers is that the percentage of menstrual cycles in which ovulation occurs increases with age. It is estimated that at the age of 15-19 only some 60-70 per cent of the cycles are ovulatory, while this percentage increases to 95 at the age of 26-30 (Becker, 1993, p. 33). It should however be remembered that these results are from data of developed countries and it is not sure as to how far they hold for developing countries. Teminabuan data show a mean age at menarche of 13.80 years (n=975). This is most likely a low estimate of the actual situation because particularly older women did

not answer the question as they could not remember, and besides, many women strongly believed that the onset of menarche occurred earlier, compared to their youth. In addition, we found that the surveyors were inclined to be guided by what they found to be a suitable age at menarche. Stanhope's research yielded an estimated mean age at first menstruation of 15.5 years among a Papua New Guinean population (cited by Young, 1987b, p. 338), which is relatively late. Tracer (1991, p. 54) came to estimates of a mean age at menarche between 17.3 and 18.4 years among a PNG population group having quite similar living conditions as the Teminabuan population. Wood *et al.* (1985a) even estimated the median age at menarche as high as 20.9 years among women living in highland New Guinea (cf. Becker, 1993). Poor diet and health are correlated with late puberty (Young, 1987b, p. 343). Groos *et al.* (1992, pp. 84-93) investigated this and found a high correlation between level of nutrition (in terms of weight for height) with the age at menarche (cf. Harris & Ross, 1987, p. 24). There is a lot of literature that subscribe to this relationship. Bongaarts (1980) examined the effect of moderate chronic malnutrition on the different factors which influence fertility and which are represented in his model. Bongaarts, as most investigators, acknowledge the effect of malnutrition on the age at menarche but attribute little effect to it on fecundity reduction as behavioural factors such as late marriage or breast-feeding always exert a far greater influence. Frish (1982, p. 1273; cf. Harris & Ross, 1987, p. 23) adds that apart from nutritional conditions affecting fecundity, there is also proof that physical labour and hard work, such as foraging activities, can delay menarche and cause irregularity and cessation of cycles, though the mechanisms by which this happens are not understood yet.

All over the world there is a declining trend in the mean (or median) age at menarche. From data worldwide it is clear that the most developed, and nutritionally well-off nations exhibit the lowest ages at menarche. Although there seems to be a biological minimum in the age at menarche, changes in the level are known to be related to principally the socio-economic condition and the state of nutrition of the women (Becker, 1993, pp. 30-31). With this in mind, it is not hard to imagine that in areas such as Irian Jaya, where economic activities have only recently started to develop, the mean age at menarche might decline in future when economic development engenders improvement of diet and socio-economic conditions.

B. Age at marriage

From Table 5.10 it can be seen that the median age at first marriage in Teminabuan subdistrict has remained stable over time. This corresponds to the IDHS (CBS *et al.*, 1995, p. 122) findings with regard to Irian Jaya. Indonesia shows a clear increase in the median age at first marriage. Child marriages which were prevalent in Java seem to be on the decline, while this phenomena has never been dominant in Irian Jaya. Wood *et al.* (1985a) found a median age at first marriage for women of the Gainj in PNG as high as 21.2 years in 1978. When analyzing the median age at first marriage according to date of marriage, we see that Teminabuan women who married before 1965 show a median age at marriage of 18.00 years (n=251), while those who married after 1984 have a median age of 20.00 years (n=506). Together with the Teminabuan data shown in Table 5.10, we can draw the cautious conclusion that recently there is a modest shift in the median age at first marriage.

Teminabuan figures show that in 1996, women aged 25-49 with no education at all have a lower median age at first marriage (19.0 years; n=134) compared to women who had received

Table 5.10 **Median age at first marriage for ever-married women according to current age, Teminabuan 1996 and Indonesia 1994**

	Teminabuan			
Age group	No. of women at time of survey	Median age	Irian Jaya	Indonesia
15-19	20	[a]	[a]	[a]
20-24	167	[a]	[a]	[a]
25-29	203	20.0	19.0	19.2
30-34	247	19.0	18.7	18.2
35-39	180	19.0	19.5	17.9
40-44	122	19.0	18.5	17.3
45-49	99	19.0	18.7	17.2
20-49	1,018	19.0	n.a.[b]	18.5
25-49	851	19.0	18.8	18.1

Sources: Teminabuan survey 1996; CBS *et al.*, 1995, pp. 120, 122.

[a] Omitted, because less than 50 per cent of the women in these age groups were first married at ages 15 and 20, respectively.

[b] n.a. = not available.

NB 1,038 ever-married women aged 15-49 answered the question on age at first marriage, which leaves 33 cases missing.

(some) secondary education or more (21.0 years; n=202). Data on Indonesia show the same trend though the difference is bigger. Here, it ranges from 16.5 to 21.9 years for similar categories (CBS *et al.*, 1995, p. 121). Education beyond primary school level distinctly increases the age at first marriage.

C. Age at first childbirth

In Indonesia, the age at first sexual intercourse is almost identical to the age at first marriage (CBS *et al.*, 1995, p. 124). In areas where contraceptive use is minimal, it is expected that the mean age of women at marriage is heavily related to the mean age of women at first birth. For Teminabuan as well as for the whole of Indonesia there is a minor increase in the age at first birth (see Table 5.11). Teminabuan data show an increase of the median age at first birth from 21.0 years for women aged 45-49 to 22.0 years for women aged 25-29, while Indonesia shows

a shift for the same age categories from 20.0 to 21.0 years. The median age in Irian Jaya fluctuates somewhat over time, but remained on the whole quite stable. Here, the median age at first birth for women aged 25-29 and 45-49 is 20.7 and 20.2 years respectively (CBS *et al.*, 1995, p. 51). The median age at first birth for the age category 25-49 is 21.0 years for Teminabuan (n=797) and 20.3 years for Indonesia (CBS *et al.*, 1995, p. 50). For Teminabuan this means that, on average, the first child is born two years after marriage (to women who eventually give birth to a first child). Notwithstanding the fact that the pattern of median age at first birth is fairly stable over time for the whole population, it considerably differs according to the various background characteristics. Urban areas, also those in 'Outer Java-Bali II', show a clear increase in median age at first birth over time, a pattern which is not seen in the rural areas. The effect of education on the median age at first birth is even more pronounced. Secondary school attendance (and beyond) increases the median age by as much as four years (CBS *et al.*, 1995, p. 50).

Table 5.11 **Median age at first birth for women according to current age, Teminabuan 1996 and Indonesia 1994**

	Teminabuan			
Age group	No. of women at time of survey	Median age	Irian Jaya	Indonesia
25-29	191	22.0	20.7	21.0
30-34	222	21.0	20.6	20.1
35-39	168	21.0	21.8	20.1
40-44	119	20.0	19.9	19.9
45-49	97	21.0	20.2	20.0
25-49	797	21.0	20.6	20.3

Sources: Teminabuan survey 1996; CBS *et al.*, 1995, p.51.

D. High risk fertility behaviour

According to the 1994 IDHS, children are at an elevated risk of dying in the event that their mothers are characterized by one or more of the following characteristics at time of delivery. First, women are considered to increase the risk for themselves and their child if their age at delivery is below 18 or above 34 years. At a young age their body is considered not sufficiently mature to endure pregnancy, while at older ages, and probably after several pregnancies, their body is likely to be less fit to carry a child. Second, there is an elevated risk if the birth interval is less than 24 months. Third, children with a birth order of more than three show increased risks. Overall, almost half of the births (44.9%) in the five years prior

to the 1994 IDHS faced an elevated risk (CBS *et al.*, 1995, p. 144). The quality of the Teminabuan data with respect to time of birth of the mother's offspring is insufficient to calculate reliable birth intervals (cf. Sub-section 2.5.2). We will therefore only look at the age of the mother at time of birth and parity (see Table 5.12). As many dates of birth are estimates, the results in Table 5.12 should be looked at with some caution, and only be regarded as indicators. Table 5.12 displays the percentage of births with elevated risk of mortality due to a low or high age of the mother and a high birth order.

Table 5.12 **High risk fertility behaviour: percentage of children who are at elevated risk of mortality, by category of increased risk, Indonesia 1994 and Teminabuan 1996**

	Percentage of births	
Risk category	Teminabuan 1996[a]	IDHS 1994[b]
Single high risk category		
♦ Mother's age < 18	2.9	4.9
♦ Mother's age > 34	11.8	1.8
♦ Birth order > 3	35.9	17.4
Multiple high risk category		
♦ Age > 34 & birth order > 3	9.6	8.9

Sources: Teminabuan survey 1996; CBS *et al.*, 1995, p. 144.
[a] Births over the period from January 1990 till the time of the survey; n=1,303.
[b] Births in 5 years preceding the survey.

With respect to the figures as presented in Table 5.12 we can make the following remarks. Given the fact that the median age at first birth is somewhat higher in Teminabuan compared to the national average and that illegitimate births are negligible, it is plausible that the percentage of births to women below age 18 is lower for Teminabuan than for Indonesia. The distinctively higher percentage of Teminabuan women over 34 who still give birth might be attributed to three factors. First, the fact that they start a little later with childbearing, automatically increases the percentage of births by mothers aged 34 years and over. Second, a higher average number of children are born to women in Teminabuan. The third factor is somewhat hypothetical as we do not have exact data on the average birth interval for Teminabuan. However, the fact that spacing of births is known and practised by women of all age categories, and the commonly expressed belief that another child should only be thought of once the last one is able to play and move about on its own makes it likely that longer birth intervals cause relatively more births among women aged over 34 years. In 43.7 per cent of the 4,973 pregnancies reported by the ever-married women, family planning was practised prior to the pregnancy. The most common method was abstinence (56.1%; n=2,165,

8 missing cases), while 4.3 per cent were explicitly ascribed to the fact that the husband had been away, usually for work. A husband's absence could result in a quite extensive birth interval. The relatively high percentage of Teminabuan women with high parity (>3) might be ascribed to the following reason. Because the national two-child policy is first introduced in the most populated provinces of Indonesia its impact is most significant in those areas. The TFR of Indonesia (TFR=2.85; 1994) is indeed closer to two than the TFR of Teminabuan (TFR=3.94).

5.3.2 Contraceptive use

Contraceptive use is dependent on a number of factors. First, it requires active support from the government in the implementation of a family planning programme, together with the readiness of the population to accept family planning regulation methods. Second, before people can decide whether or not to use family planning methods and before they select a method, they need sufficient information. Third, contraceptives have to be made available for all those people who are willing to use contraceptives. Fourth, depending on the wishes of the couple to either space the births of their children or to limit the number of children, a variety of contraceptive methods is required. To ascertain the extent to which personal preferences concur with reality, we will look at the mean number of children desired by women and compare it with their actual number of children. From these results, the unmet need in contraceptives can be deduced. All of the abovementioned subjects will consecutively be dealt with in the sections: (a) national programmes on fertility control, (b) knowledge of family planning, (c) accessibility of contraceptives, (d) use and effectiveness of contraception, (e) desired family size, and (f) unmet need.

A. National programmes on fertility control

For the period 1930-1940 the estimated CBR for Indonesia hovered around 45 per 1,000. During the crisis which followed in the years 1940-1950, the CBR dropped to about 40, after which it increased again. Together with a decline in mortality rates after the crisis, this meant a rapid increase in population figures (Hugo *et al.*, 1987, pp. 136-137). Due to repeated calls by the people, some private family planning clinics were established in the 1950s. A very important stimulus came in 1965, when the 'New Order' government started openly supporting family planning. It institutionalized the idea by setting up an advisory board on family planning. What made the government of Indonesia put even more effort in the programme was the visit of foreign experts in 1969, who strongly advised government involvement on a massive scale to deal with the organization of the programme. Initially, the programme focused on Java and Bali, as these places were considered to have a real population problem. From 1974 onwards, the programme was however extended to another 10 provinces. The programme aimed originally at the rural population and worked by way of community participation. In the period 1969 to 1984 increasingly more money and means were injected into the programme. This was done with the intention to reach the target of a 50 per cent fertility reduction, which should result in a CBR of 22 per 1,000 in 1991. According to IDHS data, the CBR was 25.1 over the period 1988-1991 (CBS *et al.*, 1992, p. 28).

The national family planning programme was introduced in the subdistrict Teminabuan in 1986, though initially it operated with a very low profile. In the period 1990-1992, the programme was extended. Nowadays, family planning service is available via the health centre of Teminabuan town, and, in theory, via the subhealth centres of Konda, Waigo, and Sawiat. The subhealth centres are however not yet in full operation which also means that contraceptives are not yet distributed from these centres. Family planning is free of charge for every citizen without a government job, while others have to pay Rp 1,500 (1996) for treatment, which is just a small amount of money for those with paid employment. Available methods are: contraceptive injection, contraceptive pill, IUD, tablet/sponge/intravag, condom, and Norplant. More women are said to take the pill than to use IUDs. Recently, a family planning team was appointed consisting of trained, mainly male, personnel, including people from other islands of Indonesia. Their task is to visit all villages on a regular basis and to provide the people with information on family planning. The programme which started in 1995 called *Keluarga Sejahtera* (Healthy Family) aims at increasing the standard of living by improvement of the economy, the health situation, and the number of participants in the family planning programme. It is not hard to imagine that this family planning team faces difficulties in their task (cf. Hull *et al.*, 1996, p. 239). Usually the members are not used to travelling in an inaccessible area such as Teminabuan, and besides, 'foreign' people addressing Papuan women and men on family planning issues does not seem the best way to get the message through either. Their social and cultural background is very much different, and they also do not speak the local language. The family planning programme receives the assistance of the wife of the head of the village; these women always head the village women's organization. They are assisted by the *kader posyandu* (trained assistants who usually help other health personnel) in their task of informing villagers on family planning. The villagers are said not to be shy to talk about family planning with the *kader posyandu*. According to health personnel on the subdistrict level, 50 per cent of the Teminabuan women aged 15-49 use modern family planning methods. Survey results however show that only somewhat less then 25 per cent of currently married women (all ages) use modern contraceptives (n=1,160; missing cases=40). Informants told us that the availability of family planning items was sometimes a problem and they were then obliged to switch to another method. Furthermore, their way of living does not always allow scheduled visits to the *puskesmas* for a new supply of contraceptives. Also there is much talk about negative side effects of the IUD and the pill (tablet and injection). Heavy bleeding, *tidak cocok* (not feeling well), and negative influences on the health of the mother were some of the side effects mentioned.

B. Knowledge of family planning

A crucial element in the decision whether or not to use contraception and if so, which method, is the knowledge of the methods and places to obtain them from. The percentage of women who have heard of any contraceptive method is very high in Indonesia (96.3%). For Irian Jaya it is 78.2 per cent (CBS *et al.*, 1995, p. 58), the second lowest figure; East Timor has the lowest percentage. The reason why the percentage is (relatively) low here is probably due to the fact that the family planning programme was introduced here only relatively recent. In Teminabuan information on health issues is spread orally by neighbours as well as health personnel. The media such as newspapers, radio, and television are rare commodities among

the villagers contrary to what IDHS data show with regard to Irian Jaya (CBS *et al.*, 1995, p. 69).

C. Accessibility of contraceptives

There is actually only one place in Teminabuan subdistrict where contraceptives are available, and most people are acquainted with the fact that the health centre in Teminabuan town is the only provider. Medicines, and items such as condoms, can however also be privately bought from a pharmacy independent from the health centre. The time needed to reach the health centre differs by place of residence. Women living in Teminabuan town can usually reach it within 15 minutes, while women from the most distant villages need to travel for two full days. This is certainly a problem for follow-up supplies of the pill and injectable contraceptives, which follow a tight schedule. As with the supply of medicines in general, the stock of medicines including contraceptives regularly run out before fresh supplies have arrived. Women then either have to switch to a method which is still available or are without contraceptives for some time. Sterilization and Norplant are only available in Sorong, for which the people have to take a boat for more than 20 hours.

According to IDHS data in Irian Jaya in general, it takes a woman (user or not) about 30 minutes to reach the source of contraceptive supply (CBS *et al.*, 1992, p. 68). To reach a hospital in the case of sterilization will take more time as they are less numerous than health posts.

D. Use and effectiveness of contraception

A prominent feature in the contraceptive practices among Teminabuan women is the high prevalence of traditional methods. Abstinence, withdrawal, and *KB kampung* (*KB kampung* stands for village family planning, in which *KB* stands for *keluarga berencana*, that is, family planning) are regarded as the traditional methods of family planning. Abstinence is an accepted and widely used practice next to *KB kampung* (cf. Caldwell *et al.*, 1987, pp. 14-15). With *KB kampung*, a specially skilled person casts a spell over food or material (e.g. thread), which is then eaten by the couple or worn by the woman. As a consequence, the woman is 'closed' and no longer fertile, until the moment the same skilled person reverses the spell, and 'opens up' the woman again (cf. Grace, 1996, p. 152; Elisabetsky & Posey, 1989, pp. 309-310). Besides exorcism, vegetable products or extracts are used for the same purpose. The principle that plants can produce fertility inhibiting propensities has been established in 1966 (Riddle & Worth Estes, 1992, p. 229) Teminabuan people have a lot of faith in these practices and regard them as methods which suit them. From the survey results it can be deduced that abstinence and *KB kampung* are methods of family planning which have already been in practice in Teminabuan subdistricts for decades, primarily as a method to space the births of children.

Of the currently married Teminabuan women, 41.5 per cent (n=1,160) do not use contraceptives (either modern or traditional; see also Table 5.13). Their reasons are as follows: 37.9 per cent of the non-users said they were menopausal, 29.5 per cent expressed the wish to become pregnant, while 14.0 per cent was actually pregnant and therefore nonusers. Another 7.1 per cent said that they did not feel alright when they used modern contraceptives, and 9.6 per cent gave other reasons such as recent delivery/still breast-feeding

(13 cases), infertility (11 cases), the fact that the husband lives far away (6 cases), illness (2 cases), and fear of negative effects of the family planning method on the child or women (2 cases). The main reason for nonuse of contraceptive methods among ever-married Indonesian women presented in the IDHS report (CBS *et al.*, 1995, pp. 113-115) is the wish to have (more) children. This is of course a more dominant reason among younger women. Health concerns, side effects, sub- or infertility, and the fact of being currently pregnant are the next mentioned important reasons for nonuse.

Among ever-married Teminabuan women the percentages of ever use of modern and traditional contraception are almost similar to the currently married women of Indonesia. Of the ever-married women, 73.4 per cent have ever used some kind of contraceptives. Of the currently married women in Indonesia, 54.7 per cent were using contraceptive methods in 1994. In Irian Jaya this is 41.3 per cent (CBS *et al.*, 1995, p. 76). Irian Jaya therefore seems to have experienced a great increase since 1991 when the level of use was 20.6 per cent. Similar to the ever use of contraception, the pill, IUD and injection are the most popular methods. Table 5.13 gives information on current contraceptive use. It is interesting to observe the remarkably high rate of traditional methods used in Teminabuan subdistrict. For Teminabuan the category 'other' consists totally of *KB kampung* and abstinence. 20.6 per cent of the currently married women use *KB kampung* and as much as 13.1 per cent use abstinence as a method of contraception.

One of the aims of the family planning programme is that women over 30 years of age and/or women with three or more children should use the most effective methods of contraception. Female and male sterilization, IUD and Norplant are considered to be the most effective methods, but they are relatively little used (see Table 5.13). Of the currently married women aged 30 and over and with three or more living children who use modern contraceptives (52% in 1994), some 15 to 20 per cent use these most effective (long-term) methods. When having fewer than three children, this percentage is considerably smaller (CBS *et al.*, 1995, p. 80).

Besides the fact that female education is influencing breast-feeding habits, it also affects the eagerness to use contraceptive methods, traditional and modern. Traditional methods, though little used in Indonesia in general, are used more than three times as much by currently married women with the highest level of education compared to women with no education at all. It mainly concerns periodic abstinence for which knowledge of the menstrual cycle is required. Also modern methods are used more frequently by better educated women in Indonesia: 39.6 per cent of the uneducated women and 62.6 per cent of the women with secondary or higher education used modern or traditional methods of family planning at the time of the 1994 IDHS (CBS *et al.*, 1995, p. 74). Teminabuan data can not be subdivided into these categories as the better educated women are predominantly women from other islands, with a different socio-economic background. Apart from their limited number, their different background would bias the results.

For comparison some data on contraceptive use in PNG has been obtained from Muirden (cited by Jenkins, 1993, p. 80). Muirden estimated the rate of overall current modern contraceptive use in Papua New Guinea to be six per cent in 1982.

Table 5.13 **Percentage distribution of currently married women by contraceptive method currently used, Teminabuan 1996 (n=1,160), Indonesia, and Irian Jaya 1994**

	Teminabuan	Irian Jaya	Indonesia
Any method	58.5	41.3	54.7
Any modern method	24.2	29.1	52.1
Pill	12.6	7.5	17.1
IUD	2.2	2.6	10.3
Injection	8.2	12.0	15.2
Condom	0.3	0.9	0.9
Norplant	0.4	3.5	4.9
Female sterilization	0.5	2.6	3.1
Male sterilization	0.0	0.0	0.7
Any traditional method	34.3	12.1	2.7
Periodic abstinence	0.5	1.6	1.1
Withdrawal	0.1	0.3	0.8
Other	33.7[a]	10.2	0.8
Not currently using	41.5	58.7	45.3

Sources: Teminabuan survey 1996; CBS *et al.*, 1995, p. 76.

[a] Of th 38.8 per cent of this category who practise abstinence, 18 per cent indicated that they practise it because they are still breast-feeding their last born child.

According to Jenkins (1993) the rate of contraceptive use declined over the 1964-1984 period. Reasons for this decline are decreasing acceptance rates, inadequate supply and poor distribution of contraceptives.

E. Desired family size

Ever-married women were asked about what they considered their ideal family size to be . During the survey it was clear that many women could not really grasp the meaning of the question. They were often not able to deliberate on the question without immediately drawing in their actual life situation. Especially women with an (almost) completed fertility history found it difficult to give a number which was different from their actual number of children. Also the fact that the decision on the number of children a couple likes to have is not always a matter of consensus between the spouses but merely decided by the husband or believed to be in the hands of 'God', made it difficult to answer the question according to their own judgement. I remember a young woman instinctively answering the question with: 'you just ask my husband', as if she had nothing to do with it. In the Teminabuan survey, already some 30 per cent of women did not answer the question, or at least did not answer with a specific number. The results as presented in Table 5.14 therefore have to be considered in the light of the above.

Table 5.14 **Mean ideal number of children for ever-married women by age group, Teminabuan 1996**

Age group	Mean ideal no. of children	No. of women answering question
15-19	2.88	18[a]
20-24	3.11	154
25-29	3.36	197
30-34	3.97	237
35-39	4.58	171
40-44	4.29	113
45-49	4.72	91
Total	3.92	981

Source: Teminabuan survey 1996.

[a] For the calculation of the overall mean number of desired children, the age group 15-19 is not taken into account in accordance with the IDHS procedure to suppress those instances where the number of women is below 25.

What can be read from Table 5.14 is that there is a clear tendency for younger women to want a smaller number of children compared to the oldest age groups. The same tendency was reflected in Indonesian DHS data, though in the latter the differences are found to be more prevalent for Indonesia than for the province of Irian Jaya (CBS *et al.*, 1995, pp. 103-104). There is a slight tendency for the ideal family size to diminish with increasing level of education of the women. The differences are however small; Indonesian women at the highest level of education wish, on average, for 0.4 child less compared to their non-educated sisters (2.8 and 3.2, respectively). The Teminabuan survey shows that women who have completed primary school only slightly differ in their ideal family size, compared to those who have not (yet) completed primary school (4.04 to 4.17; n=385 and 551 respectively). Women who completed the *SMP* (lower secondary school; n=82) want 3.85 children, whereas those who completed the *SMA* (upper secondary school; n=54) want one child less compared to the lowest educated group (3.11). We must however consider that most of the women in Teminabuan (75%; n=1,234) do not attend school beyond primary school level and, as mentioned in the section on use and effectiveness of contraception (D), the better educated women have a different socio-economic background as well. Indonesian data show that there is not much of a difference in the ideal number of children between rural and urban areas (3.0 and 2.8 respectively), though there are observable differences between the provinces. The 1994 IDHS estimate of desired number of children is 3.2 for Irian Jaya.

F. Unmet need

Unmet need is in the IDHS report (CBS *et al.*, 1995, p. 104) defined as the percentage of currently married women who do not use any method of family planning and, at the same time, do not want any more children or intend to space their next birth. The unmet need related to spacing refers to pregnant women whose pregnancy was mistimed, amenorrheic women whose last birth was mistimed, and women who are neither pregnant nor amenorrheic and who are not using any method of family planning and say they want to wait two or more years for their next birth. Unmet need related to limiting refers to pregnant women whose pregnancy was unwanted, amenorrheic women whose last child was unwanted, and to women who are neither pregnant nor amenorrheic and who are not using any method of family planning and who do not want any more children. For the research area data are lacking to calculate the unmet need. The unmet need for Irian Jaya has dropped from 22 per cent in 1991 (CBS *et al.*, 1992, p. 80) to about 11 per cent in 1994 (CBS *et al.*, 1995, p. 107). The total demand for family planning, defined as the sum of contraceptive prevalence and unmet need, is about 53 per cent, with as much as 79 per cent satisfied in their need for family planning. About two-thirds of the unmet need stems from the need to limit births. Also for the whole of Indonesia the unmet need is estimated to be about 11 per cent, of which a little more than half (5.8 %) relates to limiting and 4.8 per cent to spacing births. The total demand in Indonesia for family planning is 66 per cent, 84 per cent of whose need is met (CBS *et al.*, 1995, p. 105). When looking at the different subgroups of the population, it shows that women with little education display a higher percentage of unmet need for family planning compared to higher educated women. The unmet need is higher among younger women, mainly as a consequence of a greater need to space their children's births. Results presented under the heading 'Desired family size' in Sub-section 5.3.2 (e), however also show a wish for smaller families among women of the youngest age groups. At the same time, a higher percentage of unmet need is also prevalent among older women, though in this group, the reason is mostly the wish to limit births. For family programmes to have the most impact, they should, according to the findings of the IDHS of 1991, be directed towards the older and less educated women's need to limit the number of births and the younger and more educated women's need to space the birth of children.

'Wanted fertility rate' is a term used in the IDHS reports and expresses the fertility rate in the specific way that only births classified as wanted are included in the numerator. The difference between the actual total fertility rate and the wanted fertility rate gives an indication of the unmet need and the potential there is for family planning. For the province of Irian Jaya as well as for the whole of Indonesia, the ideal family size is half a child less than the realized fertility, though the ideal family size in Irian is 2.7 compared with 2.4 for Indonesia (CBS *et al.*, 1995, p. 109). Even though we do not have such exact information for the Teminabuan survey population, comparison of the TFR (3.94) with the expressed mean ideal number of children (3.92) indicates that, overall, the fertility of the Teminabuan women very much corresponds to their wishes. Though one should not forget the remarks earlier made on the data gathering problems encountered with the question on desired number of children.

5.3.3 Induced abortion

In the Teminabuan survey there were two ways induced abortions could be brought to light and recorded. One was when women between ages 15 and 49 were reported to have died in the five-year period prior to the survey. The relatives were then asked for the reason of the woman's death. The other one was when ever-married women were asked for their pregnancy history. For those pregnancies which ended preterm, the reason had to be given. In both cases however, no stress was put on the respondents and no explicit questions were asked by the interviewers about cases of induced abortions. The survey results show that induced abortions are never mentioned by Teminabuan women as the reason for a prematurely ended pregnancy. Of the women aged 15-49 who are reported to have died during the five years preceding the survey, 3 out of the 38 were explicitly reported to have died as a consequence of an attempt to induce abortion. As in many societies, pregnancy termination proved to be a taboo subject which could only be discussed more openly when a relationship based on mutual trust was created. From informants we know that abortions are privately and secretly performed by specific individuals in the community. Statistics on abortions in Indonesia are lacking (Hull et al., 1996, p. 230). As the Teminabuan survey did in no way provide a complete report on induced abortions in the area, we therefore have to fall back on data provided by the IDHS. From the IDHS data (CBS *et al.*, 1995, p. 71) we read that among ever-married women, 0.5 per cent report having undergone an induced abortion. Being a taboo subject, the actual figure remains therefore unknown. Boelaars (1981), Van der Hoeven (1956a) and Voorhoeve (1965) write about abortion practices in Irian Jaya in the 1950s and 1960s. Boelaars (1981, pp. 60-61) found that children are cherished among the Jaqai and abortion is not a generally accepted practice. A woman however sometimes resorted to abortion, for instance when she was ashamed of the fact that she was carrying an illegitimate child. A socially used method to ensure that the woman accepted her pregnancy was the custom that pregnant women immediately told their mother and sister(s) that they were pregnant, so they would spread the news to the community from which they subsequently experienced social pressure. According to Van der Hoeven (1956a, p. 312) abortions were mainly induced by either swallowing potions or mechanically by massaging the abdomen (cf. Voorhoeve, 1965, p. 72; cf. Jenkins & Heywood, 1985, p. 17). When comparing Boelaars with Voorhoeve, the latter found abortion to be much more prevalent among his research population. Instead of using abortion as the ultimate resort in cases where women see no other way out, abortion was according to Voorhoeve also a method of child spacing and utilized if a pregnancy was considered to be too soon after the last child had been born. According to Voorhoeve (1965, p. 72) abortions were particularly prevalent in the central hill area of Irian Jaya. In this area abortion was usually induced by massage. Hull *et al.* (1993, p. 242) confirm that these methods existed in the 1950s and 1960s and add that abortions were also induced by inserting various objects and liquids into the vagina. Usually, these measures were carried out by a birth assistant.

5.3.4 Postpartum infecundability

Postpartum infecundability is mainly influenced by breast-feeding practices, but also, though to a lesser extent, by the nutritional condition of the mother. Obviously, postpartum abstinence limits the risk of pregnancy for the period it is practised. Breast-feeding practices and the use

of postpartum abstinence and their consequences among the Indonesian women, including Teminabuan, will be discussed in the following two subsections.

5.3.4.1 Breast-feeding practices and the timing of return of ovulation

After delivery every woman experiences a period of infecundability; a period during which ovulation and menstruation have not resumed yet. Two factors which influence the length of time after a delivery for the ovulation to return are breast-feeding and nutrition. Especially breast-feeding is of major significance in determining the moment ovulation will resume after delivery. Protracted breast-feeding results in a delay in ovulation (Bongaarts & Potter, 1983). In Teminabuan women are found to breast-feed their children for nearly two years (mean duration= 23.65 months (n=3,586)[4]). Many women said that they stopped breast-feeding once they knew they were pregnant again. When it concerns women who hold a job in the office (a very small minority), they are likely to stop much earlier as they can not combine breast-feeding with office hours that well. The reason why they stop once they are pregnant again is that they think it would negatively affect the health of both the mother and the child who is being breastfed. For the mother a new baby is growing in her womb and her body would require additional effort to produce breast milk at the same time. The toddler's health would not benefit from this milk because its constitution changes, its colour becomes yellow and the milk turns into *air dingin* (cold water) which is not considered healthy for the child (personal communication with survey team, 1996). The women usually carry the child with them all day long which enables them to feed on demand. The last child is often suckled much longer, even up to five years, just because it is the last one. Almost all Teminabuan women (98.2%; n=1,250; missing cases=5) said that they breast-fed their last born child. Of those who did not, the majority of women (77.2%) gave the reason that the child had died soon after birth. Besides duration of breast-feeding, the intensity of breast-feeding is of importance with regard to the timing of return of ovulation. If supplementary feeding is given at an early age and to such an extent that it reduces the suckling stimulus of the child, it will shorten the postpartum infecundable period. Teminabuan women tend to give supplementary feeding at an early stage in life. The mean age at which the last born child is given supplementary feeding was 3.2 months, while 13 per cent of babies receive supplementary feeding below the age of one month (n=1,144). Usually this only consists of sago porridge, of which a baby gets tiny bits 'to get used to the taste of the main staple food' (cf. Van der Hoeven, 1956d, pp. 126-128). As long as this is all the supplementary food they get, it will probably not affect the timing of the return of the mother's ovulation. There is however a real possibility that because of the availability of highly nutritious baby food nowadays, changing supplementary feeding habits will shorten the postpartum infecundable period (cf. Harris & Ross, 1987, p. 49).

Nutritional condition influences the timing of return of ovulation after a delivery in the sense that poorly nourished women show a later return of ovulation compared to women with a

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[4] In the calculation of the mean duration of breast-feeding, only those children were considered who survived till they were weaned.

good nutritional status (Tracer, 1991, pp. 208-211). The nutrition of most indigenous women could, and still can not be considered good.

The Teminabuan survey data showed that, on average, menses returned 5.9 months (n=880) after delivery. This figure should however not be considered the precise mean but a good estimate, due to measurement problems with concern to duration as mentioned in Chapter 2.

In Indonesia the habit of breast-feeding was widespread in 1994; 96.5 per cent of the children was breast-fed, at least for some time (CBS *et al.*, 1995, p. 197; cf. Boelaars, 1981, p. 73). Among Boelaars's research population (in the 1950s), mothers who did not have enough milk would ask one of her sisters (exchange, younger, elder) to breast-feed the child for her (Boelaars, 1981, p. 73). From an informant we learned that previously in the Teminabuan area newborn children would first be fed for a few days by another women already suckling a baby. During those days the biological mother would squeeze out the colostrum till 'proper' milk was produced which could then be offered to the child. About present-day practice we heard stories that the children of women who squeeze out the colostrum (12.6%; n=1,232) are fed water for the time being. No information has reached us during the Teminabuan survey about women who have their child suckled by another women because they themselves are short of breast milk. In 1994, half of Indonesian children were still breast-fed at an age of 2 years and at the age of 34-35 months, 19.2 per cent of the children was still breast-fed. In the 'Outer Java-Bali II' region, the median duration of breast-feeding is a little shorter compared to the overall mean, namely 22.8 months, although the median duration of breast-feeding exclusively (when nothing else is given to the child) is above average, to wit, 2.2 months (compared to 1.3 months). About 90 per cent of the children under 6 months of age (in Indonesia as well as in the 'Outer Java-Bali II' region), are breast-fed 6 or more times per 24 hours. The period when breast milk is given exclusively is however very limited. Of the babies 0-1 months of age, 58 per cent are exclusively breast-fed. At 2-3 months of age, this percentage has dropped to 38 per cent and when the babies are 4-5 months, only 17 per cent are still exclusively breast-fed (CBS *et al.*, 1995, pp. 197-205). This coincides with what Van der Hoeven already stated in 1956, namely that although the quantity of the milk is sufficient right after birth, its volume soon decreases. The quality of the breast milk is influenced by the diet of the mother. The diet of Papuans is one-sided which, according to Van der Hoeven (1956b, pp. 286-289), makes its quality deficient. Both these factors might just explain the necessity of giving supplementary food very soon after delivery. Though the educational level of the mother influences the median duration of any breast-feeding given to the child, the period of exclusive breast-feeding is about the same for non-educated women and women who have completed primary education, 0.8 and 0.7 months respectively (CBS *et al.*, 1995, p. 203).

An example of a PNG population practising extended breast-feeding is the Gainj, among whom Wood *et al.* (1985b) did research on their breast-feeding practices and their relation with birth spacing. The median duration of lactational anovulation is 20.4 months, accounting for about 75 per cent of the median interval between two consecutive live births. For comparison, the mean interval between two successive births among the Amele of PNG was 30 months, and the mean time it took for menses to return after birth was 13.7 months (Jenkins & Heywood, 1985, p. 24). The extremely prolonged contraceptive effect of breast-feeding in this population appears to be due to a slow decline in suckling frequency with time

since parturition and absence of a decline over time in hypothalamic-pituitary responsiveness to the suckling stimulus. It is important during the period of breast-feeding that the child is fed on demand and supplementary solid food is usually not given until the child is 9-12 months old. The first solid food given (starchy tubers, bananas, papaya) are comparatively poor in nutrients, so that breast milk remains the only reliable source of high quality protein and fat in the child's diet well into the second or even third year of life. These are precisely the conditions under which breast-feeding might be expected to exert a substantial contraceptive effect (Wood *et al.*, 1985b, p. 164). It is not only the lactational anovulation that accounts for the entire birth interval among the Gainj. There appears to be a median of about seven months between resumption of ovulation and the next successful conception (conception resulting in live birth). Wood *et al.* applied data from other populations and concluded that probably two or three of these seven months represent the residual effect of lactation on ovarian cycles, and another two represent the prolongation of the birth interval by intrauterine mortality. There still remains at least three months between the postpartum return to full fecundity and the next conception. Thus, while breast-feeding may not be the only birth-spacing mechanism operating among the Gainj, it appears to be the most powerful one (Wood *et al.*, 1985b, p. 170). Why Teminabuan women show a mean length of time of 5.9 months for menses to return after delivery, while among the Amele population of PNG it is on average 13.7 months, might be attributable to the fact that Teminabuan children are given supplementary feeding at an early stage in life, whereas the Amele mother starts offering her child supplementary solid food only from the age 9-12 months onwards. Whether there are any other factors which contribute to the difference is however unknown.

According to the IDHS, a woman in Irian Jaya is on average amenorrheic for 7.4 months after a delivery, abstains for 4.2 months, and is insusceptible (by being either amenorrheic or by abstaining) to a possibility of conceiving for 8.8 months. For the whole of Indonesia the figures are 7.1, 2.4, and 7.8 months, respectively (CBS *et al.*, 1995, p. 132). Short (1985) bluntly states that a baby is the easiest and best contraceptive (cf. Tracer, 1991, p. 96). He argues that when men were still hunters and gatherers, breast-feeding was the perfect adaptation to the circumstances under which they lived. Conditions of life would have made it very hard for women to carry around more than one child. Breast-feeding brought about birth intervals of some four years, which perfectly suited the circumstances. Among Indonesian women, 71 per cent are still amenorrheic two to three months after delivery. Fifty-one per cent is still amenorrheic six to seven months after delivery and 12-13 months after delivery the group shrinks to 29 per cent. Thirty-nine per cent abstains from sexual intercourse two to three months after delivery, while eight to nine months after delivery 11 per cent still practise abstinence. One year after delivery, only 6.6 per cent continue to abstain from sexual intercourse (CBS *et al.*, 1995, p. 129). Overall, half of the Indonesian women are susceptible to become pregnant eight to nine months after delivery where no contraceptive method is used. The less education a woman has, the longer the period of insusceptibility. Women with no education are some nine months insusceptible, though for women with some secondary education or more they are insusceptible for only 5.3 months (CBS *et al.*, 1995, p. 131). There are several factors responsible for this phenomenon. First, higher education usually goes together with a more modern way of living, and therefore less adherence to traditions such as protracted breast-feeding and abstinence. Second, higher educated women usually belong to an economic group who is better off compared to the lower educated women. Their

accessibility to a steady supply of highly nutritious food is therefore better. This, amongst others, causes the ovulation to return more quickly after confinement. Besides, highly nutritious supplementary feeding will reduced the suckling stimulus of the breast-fed child. Third, higher educated women more often hold an office job compared to lower educated women. This forces them to cease breast-feeding at an earlier stage.

5.3.4.2 Postpartum abstinence

Some societies practise strong postpartum sex taboos, which also used to be common in Teminabuan, which can stretch the postpartum infecundable period even more (Bongaarts & Potter, 1983, p. 5). Quite a number of currently married women mentioned, that since delivery, they had not yet slept with their husband as they were still breast-feeding (cf. Caldwell *et al.*, 1987, pp. 14-15). This was to them a matter of fact. The precise number can not be given as they might have been fallen under the category abstinence as a family planning method - in which case we cannot ascertain whether it was because they were breast-feeding or using 'other' family planning methods. Categorized as 'other family planning methods' the explanation was indeed added. The use of 'other' methods, that is abstinence, because breast-feeding still continued accounts already for 4.1 per cent (n=682) of currently married women who practise family planning. Besides, there is also a category of women (2.6% of those who do not use contraception (n=481)), who abstain from using modern contraceptives because they believe it has a negative influence on their breast milk. For the survey area we do not have information on the period of abstinence after delivery. From the IDHS data it however shows that the period of abstinence does not differ much by place of residence or level of education in Indonesia. In most cases, women abstain 2-3 months (overall median: 2.4 months) after they have given birth (CBS *et al.*, 1995, p. 131; cf. Jenkins & Heywood, 1985, p. 17).

5.3.5 Natural fecundability and infertility

There are reasons to believe that people in Teminabuan subdistrict have always made efforts to reduce fecundity. The fact that among foragers toddlers or nursing infants need to be carried wherever they go, stimulated the spacing of children with sufficiently long intervals so that not more than one child needed to be carried on the way (Harris & Ross, 1987, pp. 22, 31). Discussing family planning with older members of the Teminabuan population revealed that tribal war, and thereby the need to move residence quickly in such situations also stimulated spacing of children (cf. Jenkins & Heywood, 1985, p. 13).

Regarding the relationship between nutrition and fecundity, it has been found that nature in fact regulates human reproductive levels according to environmental stimuli. As discussed in Sub-section 5.3.4.1 as well, suckling frequency influences the moment when the ovarian function is restored. Some believe that children of poorly nourished mothers have to suckle more frequently because of the lower quantity and/or quality of her breast milk. This then will put off the resumption of the ovarian function. Besides, recovery of the ovarian function is

slower in poorly fed women compared to well-fed women, just because any recovery is slower in people with less physical reserves (Tracer, 1991, p. 211).

Infertility is difficult to measure because it comprises of various factors. Most of the time, one only measures female infertility, although male infertility is -indirectly- taken into account. Usually, a distinction is made between primary and secondary infertility. Primary infertility concerns women who are unable to bear children. In case a woman has given birth to one or more children, but does not become pregnant again without reaching the menopausal age yet, this is known as secondary infertility. The survey data show 4.5 per cent (n=1,134) primary infertility among ever married women in Teminabuan subdistrict, defined as women who have never been pregnant and have already been married for five years or more. Jenkins (1993) found 2.4 per cent primary sterility among Papua New Guinean women (Amele, n=560) and 3.4% (North Coast women, n=1,493).

Campbell and Roberts-Thomson (1974, p. 352) conducted medical research among highland New Guinean couples who visited the infertility clinic. The overall result of the study was that of the infertile couples, 90 per cent of the women suffered from tubal pathology while some 40 per cent of the husbands had infertile or subfertile sperm. Campbell and Roberts-Thomson believe that about 90 per cent of the infertility amongst women of their study population is due to chronic pelvic inflammatory disease (P.I.D) which is assumed to result in tubal pathology and can be caused by gonorrhoea, postpartum and postabortal sepsis as well as by tuberculosis.

5.3.6 Spontaneous intra-uterine mortality

Spontaneous abortions are defined as fetal deaths which occur after the fourth week and before the 28th week of gestation. Fetal deaths after the 28th week of gestation are called stillbirths. Fetal deaths occurring before the fourth week of gestation are not taken into account because they are too difficult to detect. On the whole, there is a risk of about 17 per cent that a fetus will die before the 28th week of gestation. The risk of intra-uterine mortality is highest in the first month (8.1%) and decreases considerably till the eighth month (0.2%) of pregnancy (Bongaarts & Potter, 1983, pp. 39-40). This risk varies with age of the mother and is estimated to be twice as high for women aged 40-44 than for women in their early twenties. Although these estimations are mainly based on US data, research in developing countries such as Pakistan and Bangladesh shows more or less the same percentages.

Becker (1993, p. 42) stated in his study that 39 per cent of fetal loss remains undetected and another 23 per cent of early foetal loss after pregnancy can be detected. Becker's study refers to USA data of the 1970s and 1980s.

Bongaarts (1980, p. 568) reports that there is no evidence of any direct influence of moderate malnutrition on fetal mortality. What is known from the literature, however, is that if a pregnant woman endures illnesses such as malaria, there is an increased chance of a spontaneous abortion (Bruce-Chwatt, 1985, p. 65). Specific food items are also attributed abortive powers by the Teminabuan people, such as pineapple and a certain kind of fish. We

are quite sure of the fact that pregnancies ending in a miscarriage have been underreported during the survey. We found that 46 (0.92%) out of the 4,949 reported pregnancies were said to have ended prematurely. Though most did not give a reason for the miscarriage, people were inclined to ascribe it to a fall or hard labour, analogous to what Boelaars (1981, p. 64) found among the Jaqai population in Irian Jaya.

5.3.7 Onset of permanent sterility

The 1994 IDHS (CBS *et al.*, 1995, p. 132) recorded currently married women, non-pregnant and non-amenorrheic, to be menopausal if their last menstruation occurred more than 6 months prior to the survey or if the women said that they were menopausal. In the Teminabuan survey currently married women were registered as menopausal by their own judgement. Of all currently married women, non-pregnant and non-amenorrheic, 17.4 per cent (n=1,088) said that they were menopausal.

Long-term abstinence is not common in Indonesia, and is therefore not an important factor in the termination of the period of exposure to the risk of pregnancy. In the oldest age group it is about five per cent (CBS *et al.*, 1995, p. 133). The Teminabuan figures (see Table 5.15) clearly show a different picture. From these figures it can be concluded that abstinence is common among the research population and that it is an important means with regard to family planning, also among the younger age groups. Contrary to Indonesia, the rates for Teminabuan decline in the highest age categories. Here, bias as a result of small numbers may be at play. Table 5.15 presents data on indicators of menopause and abstinence among currently married women in Teminabuan and Indonesia.

As indicated before, the Teminabuan results are based on small numbers (see Table 5.15), which implies a significant random variation. Besides, different definitions are used in the IDHS and Teminabuan survey. Notwithstanding these limitations, we can go as far as to say that the age pattern of menopause presented for Teminabuan and Indonesia do not differ much. Wood *et al.* (1985a) estimated the median age at menopause to be 46.2 years among the Gainj women in PNG, which is based on a hormonal classification and in line with other studies. Still, their reproductive life ends at the age of around 40, which is ascribed to secondary infertility. This corresponds to Bongaarts's (1980, p. 566) findings among populations with natural fertility. The Teminabuan data do not allow for calculation of the mean age at which women become menopausal; the data only shows figures of women who stated that they were menopausal at the time of the survey without any mention about the onset of the menopause.

Table 5.15 **Indicators of menopause and abstinence among currently married women by age, Teminabuan 1996 and Indonesia 1994**

Age group	*Teminabuan 1996*					*Indonesia 1994*	
	No. of women[a]	Menopausal[b]		Abstinence as a method of family planning[d]		Menopausal IDHS 1994[c]	Long-term abstinence IDHS[e]
		no.	%	no.	%	%	%
30-34	234	3	1.2	31	13.2	6.6	0.5
35-39	176	7	3.9	25	14.2	5.7	1.0
40-41	47	5	10.6	4	8.5	8.5	1.5
42-43	58	10	17.2	8	13.7	13.2	2.5
44-45	35	8	22.8	4	11.4	23.5	2.8
46-47	38	11	28.9	3	7.8	35.1	5.1
48-49	45	19	42.2	1	2.2	51.0	5.5
Total	633	63	9.9	76	11.5	13.5	1.6

Sources: Teminabuan survey 1996; CBS *et al.*, 1995, p. 133.

[a] Number of non-pregnant, non-amenorrheic currently married women, Teminabuan.

[b] Number and percentage of non-pregnant, non-amenorrheic currently married women who said they were menopausal, Teminabuan.

[c] Percentage of non-pregnant, non-amenorrheic currently married women whose last menstrual period occurred six or more months preceding the survey or who said that they were menopausal, Indonesia.

[d] Percentage of currently married women who practise abstinence as a means of family planning, Teminabuan.

[e] Percentage of currently married women who did not have intercourse in the three years preceding the survey, Indonesia.

5.3.8 Bongaarts's model

At the beginning of Section 5.3 the background of the Bongaarts and Potter model has been described. This section will deal with the application of the model to the Teminabuan data.

The TFR is estimated by Bongaarts's model on the bases of four indices, which represent the main determinants, and the total fecundity rate (TF). The model is determined as follows (Bongaarts & Potter, 1983):

$$TFR = C_m \times C_c \times C_a \times C_i \times TF$$

The TF is considered relatively invariant because natural fertility, spontaneous intrauterine mortality, and permanent sterility, which determine TF, usually cause little change in fertility. The average value of TF is estimated to be 15.3 years. Some populations show lower TFs, especially in cases where a high incidence of disease-induced sterility is found, or in populations where spousal separation is unusually frequent or prolonged (Bongaarts & Potter, 1983, p. 87).
The indices of the model represent the following:

C_m = index of marriage of all women of reproductive age (equals 1 if all women of reproductive age are married and 0 in the absence of marriage)

C_c = index of contraception of all fecund women (equals 1 in the absence of contraception and 0 if all fecund women use 100% effective contraception)

C_a = index of induced abortion of all pregnancies (equals 1 in the absence of induced abortion and 0 if all pregnancies are aborted)

C_i = index of postpartum infecundability (equals 1 in the absence of lactation and postpartum abstinence and 0 if the duration of infecundability is infinite)

We take the estimated value of index C_a for Indonesia (C_a= 1.0) from Bongaarts and Potter (1983, p. 90), as neither the Teminabuan data nor the IDHS supplies an estimate based on observations. The remaining three indices can be calculated on the basis of the Teminabuan material. The calculations provided the following results.

$$C_m = \frac{\text{currently married women 15-49}}{\text{all women 15-49}} = 0.671 \text{ (n=1,499)}$$

In reality, the index of marriage is probably somewhat higher as by definition, it is assumed that all children are born within marital unions. In Teminabuan we came across quite a few women in the youngest age groups (15-19 and 20-24) who gave birth while still single. However, we can not make an estimate of their number, as no data on unmarried mothers were collected.

$$C_c = 1 - 1.08 \times u \times e$$

Here, u measures the prevalence of contraceptive use among all couples. The index of contraception includes a correction factor which represents an adjustment for women (couples) who do not use contraceptives because they know or think that they are sterile. The average correction factor of 1.08 is a general estimate obtained from data on the proportion of women who believe that they were nonsterile in a number of countries. The value of the correction factor is taken over from Bongaarts and Potter (1983, p. 84) as neither the

Teminabuan data nor Indonesian data provide figures for a more area-specific estimate. The average use-effectiveness of contraception is expressed as e.

$$u = \frac{\text{currently married women 15-49 currently using contraceptives}}{\text{currently married women 15-49}}$$

= 0.642 (n=975; missing cases=31)

Based on information obtained from the interviews in Teminabuan the use-effectiveness of the various methods of contraception seem to differ from figures provided by Bongaarts and Potter (1983, p. 84). Bongaarts and Potter estimate the use-effectiveness of the Pill to be as high as 0.90. Though only used by a limited number, Teminabuan women seem to experience some method failure because they are still not used to taking the Pill as part of their daily routine, nor is a continuous supply always guaranteed. In our opinion the use-effectiveness of the Pill is likely to be lower. Although it is merely an estimate, we set the use-effectiveness of the Pill at 0.60. With regard to traditional methods of family planning, from what we heard in Teminabuan, people place much trust in them. Again, none of the information gathered in Teminabuan, nor the sources consulted (Caldwell *et al.*, 1987; Elisabetsky & Posey, 1989; Riddle & Worth Estes, 1992) provide an estimate of the efficacy of the traditional methods used in Teminabuan. Bongaarts and

Table 5.16 **Prevalence and use-effectiveness of contraceptive methods**

Contraceptive method	u(m)[a]	B&P e(m)[b]	adjusted e(m)
Pill	0.147	0.90	0.60
IUD	0.021	0.95	0.95
Sterilization	0.007	1.00	1.00
Other	0.467	0.70	0.60
Total	0.642 (n=975)		

Sources: for u: Teminabuan survey data 1996; for e: Bongaarts and Potter, 1983, p. 84, to which personal estimates are added.

[a] u(m) = proportion of women using a given method

[b] e(m) = weighted average of the method specific use-effectiveness levels

Potter estimated the use-effectiveness of traditional methods to be 0.70. They based this estimate on the use of condoms and the rhythm method in the Philippines. The traditional methods used in Teminabuan are completely different. Here, traditional methods mainly concern *KB kampung* (witchcraft and plant-based extracts) and abstinence (see also Sub-section 5.3.2 (d)). Though we are convinced that the traditional methods work satisfactorily for the Teminabuan population, it is reasonable to set the use-effectiveness at 0.60. Below, we use the estimates given by Bongaarts and Potter as well as adjusted estimates (see Table 5.16) to calculate the index of contraception.

C_c = 1 - 1.08 x u x e
= 1 - 1.08 x 0.642 x 0.757
= 0.475

C_c adjusted = 1 - 1.08 x u x e
= 1 - 1.08 x 0.642 x 0.615
= 0.573

The index of postpartum infecundability, C_i, represents the ratio of natural marital fertility in the absence and presence of postpartum infecundability as a result of breast-feeding or abstinence. In the equation the numerator stands for the median length of a birth interval if no breast-feeding and/or postpartum abstinence is practised. In the model, a birth interval averages 20 months, consisting of 1.5 months for postpartum anovulation, 7.5 months of waiting time to conception, 2 months due to spontaneous intrauterine mortality, and 9 months for a full-term pregnancy. The denominator equals 18.5 months (7.5+2+9) plus the duration of postpartum infecundability. The symbol I stands for the mean duration of postpartum infecundability in months (Bongaarts & Potter, 1983, pp. 25, 86). The method of calculation is as follows.

$$C_i = \frac{20}{18.5 + I}$$

$$I = 1.753e^{0.1396xA-0.001872xA^2}$$

I = mean duration of postpartum amenorrhea, in months
A = mean duration of breast-feeding, in months

The mean duration of breast-feeding in Teminabuan is already provided in Sub-section 5.3.4 and equals 23.65 (A) months (n=3,586).

$$I = 1.753e^{0.1396x23.65-0.001872x23.65^2} = 16.715$$

$$C_i = \frac{20}{18.5+16.715} = 0.568$$

$TFR = C_m \times C_c \times C_a \times C_i \times TF$

$TFR_{Teminabuan\ 1996}$ = 0.671 x 0.475 x 1.0 x 0.568 x 15.3
= 2.76

The application of the adjusted value of C_c results in a TFR of:
= 0.671 x 0.573 x 1.0 x 0.568 x 15.3
= 3.34

As mentioned at the start of Section 5.3, in case the TFR calculated by using the Bongaarts and Potter model does resemble the TFR calculated in the conventional way, the proximate determinants can be seen as explanatory variables of the fertility outcome. When comparing the TFR calculated from the Teminabuan data in the conventional way (TFR=3.94) with the value of the TFR calculated by using the Bongaarts and Potter model (TFR=2.76), the adjusted TFR (3.34) is more or less comparable. Adjusted for the specific research population, the model can therefore be used to explain the fertility outcome and to elaborate on the way fertility is expected to evolve based on the local conditions and trends.

C_m will drop if a shift in age at marriage for women takes place, which is likely to happen at only a very slow pace, as the mean age at first marriage has been around 19.00 years of age over the past decades. As already presented in Sub-section 5.3.1.2, the median age at marriage has shown a slow increase in the figures before 1965 and after 1985. An increase in female education beyond the age of 18, and a concomitant delay in the age at marriage, is not likely to happen in the near future. A full primary education is still beyond the reach of many children and continuation in secondary education is only open to a limited group. Only very few will finally continue studies beyond age 18, the majority of whom is male. The index C_m would show an increase if health services are extended so that the death rate among married women (15-49) and men would decrease and the years spent together - without interruption due to the death of the spouse (possibly followed by remarriage) - would increase. There is however no reason to expect such a development in the short run, considering the currently limited range of services in the health system. It is however likely that there will be an improvement in future. Of course relatively few people die in this age group; still a decrease in the death rate would cause the index C_m to increase.

The proportion of married women 15-49 currently using contraceptives seems already quite high in view of the fact that some of them do not use contraceptives because they are pregnant or have the wish to become pregnant. Some of them who do not use contraceptives have been unable to bear children and some of the women in this age group are already menopausal and have no reason to use contraceptives. The main increase in this index would therefore be due to the usage of highly effective contraceptives. Although sterilization is the most effective method, it is chosen by only very few. Sterilization is not available in Teminabuan and it is therefore not the most obvious choice for people to make. IUDs are also highly effective and are available in Teminabuan. However, there are quite a few stories going around about the negative side-effects IUDs can cause, and women are therefore reluctant to use it. The efficacy of the Pill versus traditional methods of contraception has been discussed above. It is clear that most contraceptive users (72%) rely on traditional methods. Even though their precise use-effectiveness is not known, broad use and acceptance in the society advocate the retention of these methods. From our observations we even had the impression that the use of the Pill, sometimes along with other 'modern' ways of life such as shorter periods of breast-feeding, reduced the birth interval and, consequently, increased the number of births. From this we conclude that the index C_c is not likely to go down in the near future. It might even go up if effective traditional methods are abandoned and replaced by methods such as the Pill or injectable contraceptives.

The index C_i is totally dependent on the duration of breast-feeding. The longer the breast-feeding, the lower the value of C_i. Government policy aims at boosting the local economy. If, as a consequence, the Papuan population participates more in the market economy, it is very likely that more baby food products will be bought (because they will be widely available, and people will have money to buy them). As consumption of the products will lessen the suckling stimulus of the child and consequently, with shorter breast-feeding, mothers begin ovulation earlier and are able to become pregnant sooner. Without effective contraception, this will cause an increase in fertility. In view of the existing extended duration of breast-feeding found among the Teminabuan people, there is no reason to expect a further increase in duration.

5.4 Other circumstances related to fertility and fertility measurement

Besides the proximate determinants of fertility discussed in Section 5.3, which have a direct influence on fertility, several factors of the socio-economic environment indirectly influence fertility and are therefore worthwhile discussing. The rural or urban environment, level of education, health care, and occupation are examples of fertility-related socio-economic variables and are addressed below. Sub-section 5.4.3 on adoption deals with a fertility-related practice not in the sense that it influences fertility in itself, but that it might cause bias when measuring fertility. As this is customary practice in Indonesian society, it is important to be aware of its influence.

5.4.1 Socio-economic circumstances and influences

Migration of rural population to urban areas is often associated with a decrease in fertility, which is due to increased knowledge and better supply of contraceptives. Groenewegen and Van de Kaa (1967, p. 74) however expected an increase in fertility of migrants going to towns, as in town, they have access to milk and special baby products, which make it less necessary to lactate for an extended period of time (cf. Sub-section 5.3.8). An added influence is the level of education of women. In general, the level of fertility decreases when the level of education of women increases. One finding from the IDHS (CBS *et al.*, 1995, p. 44) is however that women with little education tend to have either the same number of children or more children than women with no education, a result which was also found in the 1980 PNG census data (Bakker, 1986a, p. 86). Only with a higher level of education does fertility eventually decrease. A possible explanation might be that non-educated women stick more to traditions of postpartum taboos and long periods of breast-feeding. This pattern (inverted U-shape) is also found when fertility is a function of other variables of socio-economic status such as income, landholding patterns, husband's occupation, wife's occupation, and housing quality (Hugo *et al.*, 1987, p. 157). From 1991 to 1994, the fertility of women with no education declined more rapidly compared to the women with some education (CBS *et al.*, 1995, p. 44). Although the level of education is often seen as a direct determinant of fertility, it is likely that education is correlated with many other factors which influence fertility. For the Teminabuan case the level of education is not very useful as a discriminant, as only a mere 11 per cent of women have completed schooling beyond primary school level, which leaves us with small numbers and most likely a specific immigrant group of women. Only the fact

that most women (81%) have attended primary school (fully or partially) suggests that, according to findings in the IDHS and PNG census data, this has caused fertility to remain stable or even rise a little.

Relating fertility to the kind of occupation of women, the universal pattern is that of lower fertility among women who work outside the home. Those engaged in agriculture show the highest level of fertility. Women working in trade have a relatively high level of fertility too (Hugo *et al.*, 1987, p. 157). Data from the 1980 census of PNG show that there are hardly any differences in level of fertility between groups of women according to their economic activity. Only housewives show a significantly higher fertility level, but one can argue that this is just a consequence of the choice families with a large number of children make. Having 6 children at home may simply not leave the opportunity for both parents to participate in economic production (Bakker, 1986a, p. 90). Fertility analysis by occupation would for Teminabuan basically involve women working in agriculture (mainly indigenous) and those not working in agriculture (mainly non-indigenous). Both categories have very different backgrounds (e.g. level of education and cultural traditions and values), which constitute confounding factors. Besides, the category of non-indigenous women is very small. The PNG census data do however suggest that in areas where the majority of women earn a cash income either as a wage earner or a business woman, these women show a lower level of fertility than women without any cash income. On the other hand, income from farming or fishing seems to have little or no impact on the levels of fertility. So the precise relation between cash income and fertility level seems somewhat unclear (Bakker, 1986a, p. 92). A clearer picture arises when the fertility level is related to whether or not the head of the household has a cash income. In cases where the head of the household has a cash income, the fertility of the women is significantly higher than in households where the head has no cash income (Bakker, 1986a, p. 101). In Teminabuan, women of households whose main source of income is the civil service, trade, or shop ownership (n=242) have on average 0.25 children more compared to all women (mean no. of CEB is 2.19). Tracer (1991, pp. 139, 151) interprets this as a consequence of greater stored protein and energy reserves in people who are members of a wage-earning group (cf. Sub-section 5.3.4). Figures from the 1980 census in PNG therefore suggest that whether the head of the household has a cash income or not is a more important determinant of the level of fertility than whether or not the mother is a wage earner (Bakker, 1986a, p. 101).

5.4.2 Practices related to pregnancy and delivery

Practices related to pregnancy and delivery will be discussed in a more or less chronological order. Customs related to pregnancy will be addressed first, while the last subject is on taboos after confinement. The subjects referred to in this section are: (a) taboos during pregnancy, (b) antenatal care, (c) vaccinations, (d) assistance during delivery, (e) birth and afterbirth, (f) place of delivery, and (h) taboos after confinement.

A. Taboos during pregnancy
It is considered in the best interest for the health of mother and child if man and wife refrain from sexual intercourse once the wife knows she is pregnant (personal communication with

survey team, 1996). This is also found among the Jaqai of Irian Jaya, where in addition the women had to observe food taboos and refrain from certain activities (Boelaars, 1981, pp. 63-64). According to Grace (1996, pp. 154-155), humoral medical traditions form the foundation of folk beliefs about illness and treatment throughout Southeast Asia. Based on this system of thought, foods and medicines are categorized as either being 'hot' or 'cold'. Studies in Malaysia have shown that pregnant women avoid those foods and medicines which are considered 'hot'. However, there is no fully consistent set of beliefs about what is 'hot' and 'cold'. Such beliefs were considered as old-fashioned by the population in the study area of Lombok (Indonesia) (Grace, 1996). Most (two-thirds) women did not observe any food taboo during pregnancy. Of those who did, pineapple was the food most commonly mentioned which they avoided because of the danger of miscarriage. Therefore it seems that there are still many beliefs (among the elderly) but adherence is not commonplace. According to D. Van Oosterhout (personal communication, 1998) humoral traditions are present in Irian Jaya as well and people follow them to a large extent.

B. Antenatal care

During their last pregnancy, 61.4 per cent (n=1,242; missing cases =13) of Teminabuan ever-married women went at least once for an antenatal checkup; on average they were seen 4.8 times. In the majority of cases (97.5%; n=758), they were examined by a trained midwife or nurse. Only 2.1 per cent were seen by a doctor, and in 0.4 per cent of cases only the *kader posyandu* was present. Those who went for antenatal care were usually monitored for their weight (97.3%), blood pressure (73.3%), size of the uterus (95.1%), and level of haemoglobin (68.9%). Regularly, the women were prescribed vitamins and calcium (39.0%). IDHS data show that in Indonesia, antenatal care was given to some 87 per cent of the pregnancies resulting in live births occurring in the five years preceding the 1994 IDHS. The median number of antenatal care visits was 6.2. In Irian Jaya, 77 per cent of the women received antenatal care. Most of the women in Irian Jaya receive antenatal care from a nurse/midwife (88.1%), others went to a doctor (9.3%), a traditional birth attendant (2.2%), or elsewhere (0.4%). With increasing birth order, fewer women go for antenatal care. The higher the level of education, the higher the percentage of women who go for antenatal consult (CBS *et al.*, 1995, pp. 147-151). This might either be a result of their educational level or a mere consequence of the fact that better educated women are more likely to live nearer to a health centre (under more urbanized conditions) compared to their less educated sisters, or a combination of both.

C. Vaccinations

The Ministry of Health of Indonesia recommends that during every pregnancy a women should be (re-)vaccinated against tetanus. In the Teminabuan survey as well as in the IDHS information on tetanus toxoid vaccination was obtained from the respondents. This initially may cause underenumeration. On the other hand, women might misreport other types of injections, which is not unlikely considering the fact that information on prescriptions is usually not discussed in detail between a 'learned' health provider and an 'ignorant' civilian. The percentages given should therefore be seen as an indicator. In Teminabuan some 66 per cent of those who went for antenatal care were administered a tetanus vaccination; this means that only about 40 per cent of the women were vaccinated during their last pregnancy. IDHS data show that in Irian Jaya 65 per cent of women reported that they were vaccinated against

tetanus during a pregnancy in the 5 years prior to the survey. For the whole of Indonesia this is only 2 per cent higher. There is a clear relation between the level of education of women and the percentage who received tetanus injections. The higher the level of education, the higher the percentage vaccinated against tetanus (CBS *et al.*, 1995, pp. 151-153).

D. Assistance during delivery

During their last confinement most of the Teminabuan women (73.9%; n= 1,246) were assisted by a relative. A trained midwife or nurse assisted in 18.0 per cent of cases, 3.7 per cent were assisted by a *kader posyandu*, 1.8 per cent by a traditional (not medically trained) midwife, and in another 1.8 per cent of cases no one was present. Doctors only assisted in 0.6 per cent of deliveries. Generally, in Indonesia a woman is assisted during delivery. Irian Jaya is no exception to this, although 2.3 per cent of deliveries take place without any help. In Irian Jaya, 34.1 per cent of the women are assisted during delivery by a relative, in 28.9 per cent of cases a Traditional Birth Attendant (TBA) is present, in 32.8 per cent a midwife and in only 1.2 per cent a doctor. The remaining 0.7 per cent is classified as other/unknown. According to IDHS criteria, the person recorded as present during the delivery was the least qualified person attending, as this was probably the person the women had first asked for assistance. In the case of complications, the TBA may call (in a later stage) a doctor (CBS *et al.*, 1995, p. 158). We too have tried to apply this rule during the survey.

E. Birth and afterbirth

Customs surrounding birth have been described to us by a female informant from the Tehit Gnagna clan in Teminabuan. It is quite likely that these customs apply, with variations, to the whole subdistrict of Teminabuan. Within the Gnagna clan it is customary to screen off the woman and the child after delivery for one to two weeks. For this purpose, a specific place in the house is screened off. The husband is not allowed into the screened area. During labour, the woman is sometimes tied and hung by her hands to speed up the delivery. Sometimes this is already done before the most severe contractions have started. It can take hours before the afterbirth is expelled. The umbilical cord sometimes is, and sometimes not, tied before it is cut with a knife made out of sago rib, bamboo or shell. After delivery, the woman and the child are rubbed with warm leaves. They are not bathed with water until they leave the enclosure. More generally, we are told that the afterbirth (*kakak*, which literally means elder brother/sister) is cleaned in the river and wrapped in cloth and buried in a place besides the woman's house. It is customary to plant a tree (e.g. coconut tree) next to this spot, as a reminder for the woman. From the height of the tree she can then deduce the age of the child. We only came across this custom at the end of the survey. Neither women nor men ever referred to it when we asked for their children's age. We therefore must conclude that this way of counting is becoming obsolete. The person who buries the afterbirth might be the husband, the wife's mother, or someone else (personal communication with survey team). This description still very much concurs with Boelaars' (1981, pp. 65-66) account about the Jaqai population, among whom he conducted fieldwork in the 1950s. In Malay society, Laderman (1987, p. 361) found that the afterbirth was regarded as the sibling of the newborn baby. The Malays believe that humans comprise the elements earth, water, fire, and air, and that the afterbirth only lacked the last two elements. In this way the afterbirth is ascribed human qualities and therefore requires a burial as any other human being. Malays therefore wash the afterbirth and wrap it in a sheet or put it in another kind of coffin before it is buried.

Before the arrival of the missionaries in the 1950s, people tended to kill one or both babies in cases of twins. They were considered *orang haram* or *orang keramat*, which means something like forbidden or supernatural person. Nowadays, it is up to the care of the mother whether both children survive or not, but at least there is a possibility that both twins are spared (personal communication with survey team).

Because of the bride price parents receive once their daughter(s) marry, people tend to prefer baby girls over baby boys. However, because the family name is carried only by the male offspring, they also like to have one or two boys (personal communication with survey team).

F. Place of delivery

Where their last delivery was concerned, a vast majority of the Teminabuan women (86.8%; n=1,232) delivered at home. Another 7.8 per cent delivered at the Teminabuan health centre, 3.2 per cent delivered in a Sorong hospital, 1.6 per cent chose their garden (house) for delivery, and only 0.6 per cent the *posyandu*. Just as what Grace (1996, pp. 160-161) found among her research population on Lombok, Teminabuan women preferred to deliver at home not only because it is familiar, but also because they feared going to the health centre where they have to leave behind their traditions and therefore comfort. Additional factors are costs and inconvenience. Grace adds that women feel much more at ease in an environment where the helpers speak the same language and are of the same social status. Of the Indonesian women 70.6 per cent delivered at home in 1994. For Irian Jaya, this is slightly higher, namely 74.2 per cent. In Irian, the remaining women deliver in a government hospital (15.8%), in a health centre (6.0%), or at someone else's home (2.1%) (CBS *et al.*, 1995, p. 157). The percentage of Indonesian women delivering at home, sharply decreases when the level of education increases, and also when more antenatal care visits accompanied the pregnancy. With increasing birth order, the percentage of deliveries in private homes increases as well. More mothers under 20 or over 35 years of age tend to deliver at home than mothers in the intervening age groups. This means that relatively more women in the high risk group (cf. high risk fertility behaviour) deliver at home (CBS *et al.*, 1995, pp. 156-157).

G. Taboos after confinement

After delivery it is said the couple can resume intercourse once the women is physically fit again. So there is no prohibition on sexual intercourse while breast-feeding (personal communication with survey team). This contradicts with the practice commonly found in the villages, that is the custom of not having intercourse while breast-feeding, as it is considered too soon to have another child if the last born is still so dependent. Once a child is able to play and move about on its own, then it is alright to have another child. Probably, availability of (modern) contraceptives plays a role in this shift in attitude. Van der Hoeven (1956b, pp. 291-292) writes that in most parts of New Guinea intercourse was not resumed until the baby started to walk, consequently resulting in a birth interval of at least two years. This is quite similar to what Jenkins and Heywood (1985) found among the Amele of PNG.

There are several food taboos for women who delivered recently. These restrictions should be observed for about a month after delivery. The reason for a change in the feeding pattern is that the woman still has a wound. When a woman delivers in the health centre and is given medicines after delivery to cure the wound in her womb, the restrictions are to be observed

for only one or two weeks after confinement. The food restrictions are such that food should be boiled. Salt, cooking oil, santen, water from young coconut, and sour foods should not be eaten. Besides food taboos, the women should not bath with cold water. They are however allowed to drink cold water. The belief is that not obeying these restrictions would result in death from infection. *Darah putih* (white blood) which is filthy can develop and it can *naik otak* (enter the brain) from the womb. When bathing with cold water, in the river for instance, they might become dizzy, tumble over, and die (personal communication with survey team, 1996). This very much resembles Manderson's (1981, p. 511) account of Malay society and the practices Grace (1996, p. 162) describes based on research by Manderson and Laderman. According to them, food and behaviour restrictions after confinement are conceived to recover the balance between 'hot' and 'cold' in the woman's body, which has been upset by the process of confinement.

Of the last born children of the Teminabuan survey population, 12.6 per cent (n=1,232) were reported not to have been given their mothers' colostrum. The main reasons given are: fear that the child will fall ill (52.3%), that it is considered dirty (12.1%) or not good (10.1%). Therefore, the main reason for not giving colostrum is that it is considered not good for the child. Van der Hoeven (1956b, pp. 286-289) and Jenkins and Heywood (1985, p. 18) also found other areas where people considered it inadvisable to give the colostrum to infants.

5.4.3 Adoption practices

According to Niehof (1985, pp. 303-304), child adoption can be considered the cultural answer to the uneven natural distribution of births and deaths among families and as a way to deal with misfortune where fertility and mortality are concerned.

Adoption is, as elsewhere in Eastern Indonesia and the Pacific area (Visser, 1989, pp. 115-118), common practice in Teminabuan; of the ever-married women interviewed 14.4 per cent stated that they (still) have an adopted child (n=1,358; missing cases=13). Knauft (1993, p. 162) roughly estimated that some 16 per cent of the Marind population of southwestern Irian Jaya are persons who once have been adopted. Teminabuan women with adopted children usually have more than one, on average they have 1.7 adopted children. There is a small preponderance of women over men; 52.8 per cent of the adopted children are female. Because the Western concepts of adoption, fosterage, and own children might be different from those in the research area, we first discuss the five categories of children Teminabuan women differentiate. The first is what they call *anak kandung*, literally meaning 'child from the womb', what we call biological child. The second is called *anak angkat*, meaning adopted child and usually refers to children who are adopted at a very young age. The biological and adoptive parents of the *anak angkat* are usually related. The child will take the family name of its foster parents. Third, there is a special kind of *anak angkat*, that is *anak harta*, which refers to a child who is adopted by relatives of the child's biological mother. This child serves as a payment for the bride price which at the time of the child's birth was not yet fully paid by the family of the biological father. Fourth, there is the stepchild, called *anak tiri*, who is a biological child of the husband. Finally, we have the *anak piara*, who is more a foster child and who is usually adopted at a later age. This adoption can be temporary, for instance only

during a period of schooling. Often there are family ties between the parents. In general, this child will keep its own family name.

The adopted children reported in Teminabuan have at least in 88.5 per cent of the cases a blood relationship with their adoptive parents, as only 11.5 per cent are categorized as *anak piara* (n=347). Many adopted children (39.5%) are categorized as *anak angkat*, 25.6 per cent as stepchildren, and only 0.6 per cent specifically as *anak harta*. The category 'other' holds the remaining 22.8 per cent, mainly consisting of grandchildren. It is possible that children who are adopted as *anak harta* are called *anak angkat* at the same time. The same accounts for *cucu* (grandchild), who in case of adoption by the grandparents is usually called *anak angkat* as well. Actually, 19.3 per cent of the adopted children are grandchildren of their adoptive parents. We came across this phenomenon several times and it is common in cases where the biological parents are not married.

The main reasons to adopt a child given by Teminabuan women are that the child's mother had died (25.2%; n=345), that the child was born to an unmarried women (22.3%), that both parents had died (17.6%), that the parents had split up (16.5%), and that the father had died (6.5%). Some of the other reasons for adoption which are given are: that it is a gift by a relative to compensate for the childlessness of the adoptive couple (2.3%), that the child belonged to a set of twins who were separated to lessen the burden of care (0.9%), or that in this way the child is able to go to school (2.9%).

Boelaars (1981, pp. 43-44), working in the 1960s among the Jaqai who live in a coastal area of Irian Jaya, found that adoption was prevalent among this population. The immediate reason could be the birth of twins, or the wish of a couple to provide their son with a *nati*, an exchange sister. Adoption could also be used as a means to restore friendly relations after there had been animosity between two groups. The biological parents and the foster parents contract, as it were, an exchange marriage. The children of these two couples are looked upon as cousins. Adoption can therefore be regarded as a secondary type of exchange marriage between two married couples. In both cases the prohibition of sexual intercourse is not restricted to the 'cousins', but is extended to all children of the two couples that exchanged a child.

McDevitt (1987, p. 62) regards adoption to be the permanent acceptance of major responsibilities of the natural parents by another individual or couple. Although fosterage is usually seen as a temporal acceptance of responsibility for the care of a child, it is often not differentiated from adoption and people often make no distinction. This is where errors in demographic data occur, namely when a child is claimed by adoptive or foster parents as their own. Adoption can take place at different ages. In PNG early adoption is preferred, and the wish to adopt a child is made clear by the future adoptive parents to the natural parents, sometimes even when the mother is still pregnant. In many cases, the natural mother breast-feeds the child. In the meantime, the foster mother is increasingly involved in the upbringing of the child. The child is only transferred to the foster parents when it is weaned completely, usually in its second year (McDevitt, 1987, p. 66). We also came across this phenomenon in Teminabuan. Jenkins and Heywood (1985, p. 19) also found that among the Amele of Papua New Guinea it was commonplace to have the child breast-fed until it is weaned before

handing it over to the adoptive parents. However, they noted an increasing incidence in adoption which had brought along a new practice. Some of the adoptive mothers had the wish to breast-feed the child themselves. To make sure they are able to produce milk, and milk which is of the required quality, they go to the local midwife for injections of hormones and tranquilizers. We never heard of any such practices in Teminabuan subdistrict. After puberty the child is considered too old to be able to establish the desired relationship with the adoptive parents, and for this reason adoption after puberty is not common. In terms of data collection, it is of major importance to what extent a society is open in acknowledging adoptive relationships and to what extent the adoptive child is at the same time aware of its position. In PNG this varies from one society to another. Hogbin (cited by McDevitt, 1987, p. 79) notes that when a person wishes to adopt a child, he usually first consults his closest relatives and, especially his brothers. Some societies do not consider the natural parents to be of major importance, but the clan of his (foster) parent from where his spirits derive. Among the Jaqai (Boelaars, 1981, p. 62), the arrival of the soul is compared with adoption. This might be a reason why foster fathers make no claim to biological fatherhood, as they simply do not place any value on physiology (Fortune, cited by McDevitt, 1987, p. 83). As just women can have a blood relationship, they might be more valid claimants of being the biological mother, even if they are not.

McDevitt (1987, p. 90) describes three areas related to adoption which influence the misreporting of children. First of all, if the interviewers are familiar with the survey population, they are more likely to unravel the biological relationships. Second, the frequency of adoption and third, the pattern of movement, that is to say, do children tend to be adopted by women of certain age groups? Bakker (1986, p. 107) mentions that the pattern of fertility by the age of the mother is severely biased towards the older ages. This is the result of the prevalence of adoption of children by foster mothers who are older than the natural mother, and women usually do not differentiate between their natural and adopted children. The incidence of adoption is not known, therefore it is uncertain how far the adjusted age patterns of fertility reflect reality. The first point heavily depends on the openness of the society. Because we were aware of the phenomenon from the literature before conducting the survey and because the assistants were indigenous to the research area and were very familiar with adoption practices, we think we have succeeded in unravelling the real origin of a woman's children. On the other hand, when women divulged their fertility history, they did not always mention the children that had been given away for adoption. It proved to be very hard to recover all information on this topic. If the fertility histories leave out most of the information concerned with these children, fertility levels might be somewhat underestimated. Probably this will account more for young women than older women. As all the children of the latter have already moved away, it would be pointless for them to withhold information about children they once gave away for adoption. Besides, some of the children not mentioned were mentioned by a survey assistants anyway because she belonged to the local community and these practices were common knowledge. The rate of adoption depends on the social organization of individual societies and the changing circumstances which give rise to the need for adoption or fosterage. In cases of death of partners or a parent, divorce etcetera, adoption is likely to be more frequent. After an epidemic, adoption rates might increase sharply. With declining mortality adoption rates are expected to decline as well. On the other hand, as infanticide has been forbidden the number of 'unwanted' children consequently may

have increased. Besides, sexually transmitted diseases which have been on the rise over the years have resulted in an increased percentage of sterility in a number of societies. The abovementioned factors may have contributed to a rise in the incidence of adoption (McDevitt, 1987, p. 97). Death of one or both spouses is an important reason for adoption in Teminabuan. Considering the development in health services, it is not expected that the death rate among people in this age category will drop drastically in the next few years. In fact, with the 1997 drought in the whole of Irian Jaya, diseases and with it, deaths will probably increase. Bakker's observation about the bias in the pattern of fertility due to higher ages of adoptive mothers compared to the biological mothers is likely to hold for the Teminabuan case as well. First, we saw that adoption of grandchildren is common, and that the ages of the adoptive and the biological parent are a generation apart. Bias in the fertility histories of these 'granny's' will however be limited for the Teminabuan data as we have tried to the best of our ability to unravel most of these children's true origin. However, a bias towards older ages of the mother is probable in the case of adoption by an infertile couple. It is likely that they have tried to have children for a number of years before they accept that they are infertile and adopt a child of one of their siblings. This automatically means that at the time they get their first (adopted) child, they are older than they would have been if they had been able to have biological children.

Estimations of fertility and mortality rates may be significantly biased in case of misreporting of parentage due to adoption. This kind of data errors will affect the following rates: (1) direct estimates of fertility based on age-specific frequencies of childbirth during the preceding twelve months; (2) indirect estimates of age-specific fertility; (3) child mortality based on total numbers of children ever born and numbers surviving cross-tabulated by age of mother and; (4) indirect adult mortality estimation. If children by adoption are reallocated to mothers belonging to the same age group as the biological mothers, age-specific rates and probabilities of dying before exact age x, will not be seriously affected. This is however unlikely to be the case. Although indices using broader population bases (e.g. GFR, CWR, CBR and CDR) will be free of the particular source of distortion discussed earlier, often indirect measures are preferred (McDevitt, 1987, pp. 99-100).

5.5 Summary

This chapter describes fertility, its measures, its main determinants, and other additional circumstances which influence fertility outcome.

The number of children ever born (CEB) provides information on the level of fertility. Compared to the general Indonesian population of 1994, Teminabuan women (45-49) have about half a child less at the end of their reproductive life. Teminabuan women end up with a mean of 4.46 CEB, whereas for Indonesia in total it is 5.04. The total fertility rate (TFR) is however the most important fertility measure as it is an overall measure of fertility which is not influenced by the age structure of the population. The TFR shows the average number of children that would be born to a group of women if they maintained current age-specific fertility levels throughout their reproductive lives. If fertility is more or less stable over time, the number of CEB at the end of the fertility period and the TFR should be more or less

similar. This is the case for Teminabuan (cf. Table 5.9). Irian Jaya in general and Indonesia show however a decrease in fertility over time (no. of CEB>TFR). The fact that Teminabuan's fertility has been stable over time can be explained by the limited and only recent use of modern contraceptives with a probably high rate of method failure due to improper use in contrast to traditional methods. Also the mean age at first marriage has been stable over time. As a downward trend was observed in the ideal family size in Teminabuan, the TFR could be expected to decrease in future.

Bongaarts and Potter modelled four main proximate determinants of fertility which directly influence the course of the fertility process. Changes in these proximate determinants produce changes in the TFR. As the TFR calculated in the conventional way (3.94) quite agrees with the TFR calculated with the adjusted Bongaarts and Potter's model (3.34), the proximate determinants can be considered explanatory variables of the fertility outcome. This makes it possible to elaborate on possible future trends of the TFR. As has been explained in Sub-section 5.3.8, the marriage index, C_m, is not likely to change much in the near future. C_c, the index of contraception, is, in the event of changes in the near future, more likely to increase rather than decrease. Contraceptive use is already quite high. However, greater use could be made of more effective methods. Replacement of traditional methods by modern contraceptives such as the Pill or injectables might however be contraproductive. The longer the period of breast-feeding, the lower the index of postpartum infecundability (C_i). As the common practice in Teminabuan already is extended breast-feeding, there is no reason to believe C_i will decrease any further in future. To the contrary. Should economic means become more widespread, and with it, baby food products within reach of the majority of the population, C_i is likely to increase. Introducing nutritious supplementary feeding will reduce the suckling stimulus of the child, and consequently advance the return of ovulation. Without effective contraceptives this will cause fertility to increase. Therefore, even as the ideal family size decreases, the proximate determinants do not indicate a reduction in fertility in the not too distant future.

Safe delivery practices are certainly welcome in Teminabuan as quite a number of births carry increased risks for mother and child. In Teminabuan, elevated risks of dying are inherent in the following: untrained assistance during delivery (73.9% of births are assisted by a relative), the relatively high percentage of births with a rank number higher than three (36%), and older age of mothers (above 34 years accounting for 12 per cent of births). Concerning the mother's age at birth and the rank number of births, some ten per cent of deliveries are by women with multiple high risks. If delivery health care practices become safer, it would not so much affect the mean number of children ever born to a woman but surely the number of surviving children would increase.

The present chapter presents a comprehensive account of fertility in Teminabuan. The data are however subject to bias resulting from various local conditions. Age measurement is for instance hampered by the non-importance of this issue to the local population and by the fact that it is not documented. Recall bias occurs predominantly among the oldest cohorts of women. Usually, data regarding children who died at an early age are most affected. The practice of adoption can, if not recognized, distort fertility data. Adoption is widespread in Teminabuan. Fortunately, the literature drew attention to this practice, and also the local

assistants were fully aware of this phenomenon. We can therefore guarantee a quite accurate reproduction of the fertility histories of the ever-married women. Still, more in-depth research could shed light on these issues.

Chapter 6 Migration

6.1 Introduction

Movements are always defined in terms of time and space and may also include other aspects such as the reasons for movement, the characteristics of the movers, or the unit moving (e.g. individual or household) (Willekens, 1982, pp. 74-75). With regard to the time-space reference, spatial movements can be categorized by an absence of a few hours to years, the travelling distance can range from a few metres to many kilometres, and there may be an intention to settle in the place of destination or an intention to return to the place of origin (Willekens, 1982, p. 75).

Census data, the most widespread source of migration data, only reveals spatial movements which concern a change of usual residence to another administrative area (in the Indonesian census: province) for an extended period of time. As circular migration (for definition see Section 6.2) is the most common type of movement in the research area, census data can not be used to describe the local mobility patterns. The 1996 Teminabuan survey data are used to distinguish the types of spatial movements in the research area. In the 1996 Teminabuan survey movements were recorded if they met the following criteria. With regard to space, if the village border is crossed; as for time, if it concerns a minimum period of absence. In the Teminabuan survey migration is considered permanent if there is no (intention to) return within six months. The condition is that the movements involve other purposes than visiting friends or relatives, hospitalization, and the like. From this it follows that census data and the 1996 Teminabuan survey data are not comparable where spatial movements are concerned.

This chapter on migration will discuss the following. First, the definitions of the types of migration in the research area will be presented (Section 6.2). Second, some remarks will be made on the data sources available (Section 6.3). Third, the subject of past mobility patterns in and around the research area are described (Section 6.4). Furthermore, the current patterns (Section 6.5), reasons (Section 6.6), and consequences (Section 6.7) of migration are discussed, and a summary on the findings (Section 6.8) concludes the chapter.

6.2 Definitions of migration

Various authors have defined migration and migrants in several ways. However, all have to specify the boundary which should be crossed as well as the (minimum) duration the person (or household) needs to spend in the area of destination before such a move can be called migration. Therefore, migration always relates to the act of moving, thereby covering such a distance that an - arbitrary usually administrative - border is crossed.

During the Teminabuan survey, movements were considered migration if the person left his or her village (criterion for space) for some period of time (criterion for time). Even if there was no intention of permanently settling down in the place of destination, the move is still considered permanent if it lasts more than six months (criterion for time). This agrees with the definition of permanent migration given by Forbes (1981) which is presented below. The period of time spent in the place of destination determines the type of movement. Commuting, circular migration and permanent migration can be distinguished by the degree of permanence of the movement. Though there is no worldwide agreement on their definition, there is a broad consensus. Roughly speaking, when people return the same day to their place of residence and spent a minimum number of hours in the place of destination, they are called commuters (cf. the definition of commuting by Willekens, 1982). If migrants spend the night in the place of destination, but regularly return to their place of origin, they are considered circular migrants (following the definition of circulation by Zelinsky, cited by Jones & Richter, 1981). If migrants stay in their place of destination for at least six months and regard this as their usual place of residence, they are considered permanent migrants (following the definition of permanent migration by Forbes, 1981). The movement can have various reasons. In this study movements with the purpose of visiting relatives or hospitalization and the like are not considered migration. If it concerns non-permanent migration, only the movements for work, looking for work, and education are taken into consideration. Types of migration which describe various movements in Indonesia, and in particular Irian Jaya, are listed below. Transmigration as a type of migration is relevant for Indonesia as a whole, but as there are no transmigrants in the research area, it has not been an issue in the Teminabuan survey. Therefore, transmigration is only discussed in the section on past mobility patterns. One should be aware that in studies dealing with migration, different definitions are used. Straightforward comparison of migration studies is consequently not possible.

Mobility can be placed in a time-space continuum. With concern to time, first the degree of permanence of a movement is taken to categorize mobility activities. Besides, movements can be divided into those without and those with relocation of the usual place of residence (Willekens, 1982, p. 80). Below, definitions are presented on the various types of migration and migrants which are applicable to the research area.

Commuting: a particular type of circular mobility, with the difference that the degree of permanence is less, as it normally does not involve staying overnight outside the usual place of residence (Willekens, 1982, p. 78).

Circulation: a great variety of movements, usually short-term, repetitive or cyclical in nature, but all having in common the lack of any declared intention of a permanent or long-lasting change in residence.
Circular migration: circulation, involving continuous but temporary absences of more than one day. The migrants consider their place of origin as their usual place of residence (cf. Zelinsky, cited by Jones & Richter, 1981, p. 169)

Seasonal migration: migration which does not involve a change in usual place of residence. It can be seen as a type of circular migration with a larger degree of permanence (and therefore less frequent movements).

Permanent migration: when there is no return migration within six months after moving (Forbes, 1981).

Lifetime migrant: a person who at the time of the survey is not living in his province of birth (Walsh, 1987). Skeldon's (1979b) definition of lifetime migrant is somewhat different. He considers a person to be a lifetime migrant who is on the 'night' of the census in a place other than the one he was born. Walsh's and Skeldon's definitions therefore vary in the determination of the border which should be crossed before a person can be called a lifetime migrant. Besides, Walsh works with the *de jure* place of residence whereas Skeldon considers the *de facto* place of residence. In the Teminabuan survey persons are considered lifetime migrants if they moved their usual place of residence outside the village of origin (or previous village of usual residence). So, in fact, it is a combination of Skeldon's and Walsh's definitions.

Newell (1988) presented definitions on various types of migrants:
The return migrant: a person having migrated from area A to B and then returns permanently to area A.
The inmigrant: a person who crosses an internal (arbitrary) - usually an administrative - boundary with the intention to go and live within these boundaries.
The outmigrant: a person who crosses an internal boundary with the intention to stay outside these boundaries.

Primary migrants: persons who were living in their place of birth in the year t_1 and in another place in the year t_2 (Willekens, 1982, p. 83).
Secondary migrants: persons who were living outside their place of birth in the year t_1 and in a third place in the year t_2 (Willekens, 1982, p. 83).
t_1= in the Teminabuan survey t_1 represents the time of the 1990 census.
t_2= in the Teminabuan survey t_2 represents the time of enumeration.

Chain migration: migration by persons who follow the track of former migrants through whom they learn about possibilities of work and housing, and who are usually assisted in finding housing and employment. Chain migrants are not pioneers (cf. Gooszen, 1994, pp. 196-197).

Transmigration: initially transmigration concentrated on planned transfer of large numbers of people from the overcrowded parts of the country to sparsely populated areas as a means of easing the population problem. However, since the First Five-Year Plan in 1969, the focus of attention of transmigration became more and more directed on regional development. Improvement in the mobility of labour to support development of the provinces outside Java and Bali became more important than relieving the population pressure in Java (Hardjono, 1977, p. 7).

Spontaneous migration: this term must be considered within the framework of transmigration. Besides government-sponsored migration (people selected and financed by the government to migrate) there are people who migrate of their own free will and without government sponsoring. This latter kind of migration is called spontaneous migration, and often has a 'chain' character.

With regard to the distance covered by a movement, as circulation is the most common type of migration encountered in the research area, this consequently means that most migrations are short-distance movements. Though short-distance migration is relative, for Irian Jaya it means that most migration is intraprovincial, whereas in the research area it even means migration within the subdistrict. Given the poorly developed infrastructure in Irian Jaya, travelling a short distance can still be a major operation with regard to the effort and time required.

6.3 Data on migration

Detailed migration figures are hard to come by. Hugo (1997, p. 71) has amongst others analyzed Indonesian census data and noted that only the more or less permanent interprovincial migration was recorded in these censes. Especially short-term (circular; commuting) migration is not recorded. The 1996 Teminabuan survey[1] measures the mobility of individuals aged 18 years and older, and of those who are married before the age of 18 (n=3,248). During the Teminabuan household survey, all persons who belonged to this group were selected from the household survey for an interview. In this way, 470 migrants were identified who, together, made 582 movements since 1990. Besides, the heads of the households were asked about any unmarried children who had moved away permanently (n=322). In accordance with the ESCAP migration survey (Willekens, 1982, p. 82) children who moved from their parents' village to another village for education or work, were considered migrants as they had changed their usual place of residence (*de jure*). Due to this method of selection, the data has limitations. That is, only persons who moved to and/or within the Teminabuan subdistrict were selected for an interview. Those who moved out of the subdistrict, except for the unmarried children, could not be contacted. The selected persons were asked about their place of birth, their parents' place of birth, and their village of residence at the time of the 1990 census, including all movements they had made ever since. Short-term movements for work or education are probably underrecorded as they tend to be overlooked by the 'migrant' as well as by the interviewer. The travelling distance (in time) together with the reason for migration are

[1] This chapter describes migration supported by, amongst others, data from the Teminabuan survey. This survey provides the following figures: survey population aged 18 years and over or married before that age=3,248; number of migrants=470 (males: 267; females: 203), who together made 582 moves since 1990. 228 households have one or more children living permanently away from them. This involves 322 children. The figures indicated in the text can deviate from the aforementioned ones if only a section of the total number is referred to or differ slightly as a result of missing data due to, for instance, non-response or loss of data when variables are combined.

recorded as well. Below, the 1996 Teminabuan survey will be referred to as the (1996) Teminabuan survey.

6.4 Past mobility patterns and transmigration

Mobility is a part of life in a country made up of thousands of dispersed islands, and we will therefore first look at the characteristics of mobility in the past (Sub-section 6.4.1). Transmigration (Sub-section 6.4.2) has also been long present in Indonesia. Official programmes which started as early as 1905 (Skeldon, 1997) are interesting to look at, especially with regard to Irian Jaya.

6.4.1 Past mobility patterns

The population of Indonesia can in general be characterized as mobile. There are for instance several ethnic groups in the outer islands who have long established traditions of outmigration. The Bugis of South Sulawesi, for example, is a group with a seafaring tradition. Already in the 18th century they began establishing colonies in other islands of Indonesia such as Kalimantan, South-East Sulawesi, the Moluccas, East Nusa Tenggara and, more recently, in Irian Jaya, Jambi, and Java (Hugo *et al.*, 1987, pp. 196-197; cf. Gooszen, 1994, p. 196). With the definitions at hand, traders and others from for instance Sulawesi who settled in Teminabuan are categorized as permanent migrants (different from transmigrants, which includes government involvement).

In Irian Jaya too, there is a long history of migration. Warfare, *hongi* raids, marriage and the slash-and-burn method of cultivation were some of the these movements. It all mainly concerned short-distance movements and, except in the case of marriage, the aforementioned movements were short-term. International migration has so far been negligible. During Dutch colonial occupation of Irian Jaya (cf. Sub-section 3.2.2), measures were implemented which affected these movements. Warfare and *hongi* raids were for instance no longer allowed, and settlement in villages was encouraged. These regulations led to a decrease in movements. Other measures which the Dutch colonial rule introduced and which did in fact stimulate migration were: setting up of plantations, exploitation of mines, and the installation of a civil service (police, administration, etcetera). This type of migration was carried out over a longer distance and for a longer period of time. After some time, migration to urban centres became more important. Rumbiak (1985) states that more involvement of the Dutch in Irian Jaya since 1950 triggered a stream of migration towards Jayapura from its surroundings as this now became a centre where alternative jobs were offered and where highly valued manufactured goods became available. Since Indonesia took over Irian Jaya in 1962, there has been a considerable boost in the economy. 80 per cent of the children are enrolled in primary schools. Still, with regard to education and standard of living, the indigenous Papuans lag behind. Besides, stringent regulations surrounding travel permits hinder migration of Papuans to urban areas (Lagerberg, 1987).

Until now, the most detailed study of past migration waves in the Bird's Head area has been conducted by Pans (1960). This section is therefore mainly based on his publication. Pans studied migration among the Arfakkers in the northeastern part of the Bird's Head area of Irian Jaya. The data sources he used are legends and stories recorded by missionaries and himself together with reports from colonial government officials and the missions. The sources he used date from 1700 A.D. Pans found that the direction of migration was determined by various factors. He assumed that rivers acted as migration routes and learned that westwards, the basin of the Kamundan River functioned as the frontier of migration because of the alleged cannibals who were living there. There was however contact between clans living on opposite sides of the river. This contact was mainly concerned with trade of *kain timur* (woven cloth used as bride price and currency). Pans considers the presence of cannibals the main reason why eastern clans migrated only to the northern, northeast or eastern side of the Bird's Head. For those living in the lowlands in the south of the peninsula, the slave trade was, according to Pans, the most important reason to migrate to the more mountainous areas. Other reasons for migration, which Pans deduced from his material, were depleting soil quality and increasing population density. These less accessible mountain areas provided them with more protection. The long-existing slave trade has probably brought about another phenomenon, namely that some populations handed children over as a peace offering. Besides external reasons, there could be internal reasons which prompted a community to move. For example, fighting between clans or within settlements could bring about a splitting up of the community. This phenomenon is even currently still found in the Teminabuan area. Local belief systems also helped to speed up the pace of migration every now and then. When for instance deaths suddenly occurred, this could arouse fear about the place of settlement (for instance due to belief in *suanggi*; cf. Haenen, 1998). The main reason to move was however the availability of easily tillable land elsewhere. Occupation of the north coast took place only after the *hongi* raids had been banned. Centres of trade were attractive places to move to. In places where fertile land was available, like some of the inland areas, high population densities were found. Trade ensured that contacts with the coast increased in intensity, which resulted in a gradual occupation of the areas along the trade route between the inland centres and the coastal centres. The scale at which migration took place increased since 1850, when trade became more important, especially some 25 years later when the trade in birds of paradise was also concentrated in the Doreh Bay. Different products were introduced in the highlands, among which tobacco. In this way the inland population became involved in trading as well. Later, they provided a lot of birds of paradise for trade. The small coastal centres, which had come into being through trade and colonization by clans moving to better places, were later used as trading posts for bird hunters and traders. Next came the missionaries and the colonial administration. In Numfor, people from the coast traded with the inland population in iron tools which provided the inland population with the means to produce a surplus and reduce the burden of work. Food and labour were products the inland population could offer for trade. When iron tools were available in abundance, the people of Numfor started trading female slaves in exchange for food. Female slaves were merely seen by the inland population as a source of manual labour to help till the land and to produce a surplus. The slave trade along the south coast deterred migration to this area. The north and east coast on the contrary had

many interesting items to offer, such as iron tools, ornaments of shells, beads, tobacco and several new food products, bamboo, sago palms and salt produced from seawater. Reasons for migration to the north and east coast in the 1960s were that towns became easily accessible so goods could be purchased, and the alleged immunity against the power of the *suanggi* (witches) when living in an area under foreign administration (Pans, 1960). Miedema (1984, p. 55) found that the (later) settlements in the Kebar district in the central interior of the Northeastern Bird's Head were inhabited by clans who, by settlement, all came from the same area. Similar to the direction of migration which Pans found, Miedema also noted that migrants moved predominantly from the hilly area in the south to the plains in the northern part of the Kebar region. Haenen (1998, pp. 238-245), who studied migration patterns of the population in the southeastern Bird's Head, found that in recent times (1970s-1980s) people moved from the interior to the south coast.

The data from Pans, Miedema, and Haenen only cover the eastern part of the Bird's Head. From their publications it shows that migration in this area is a complicated matter in which ecological, (ethno-)historical, and demographic factors interact. Moreover, it is still unknown whether the picture of migration as found in the eastern Bird's Head, images migration in the western part of the peninsula. However, the Teminabuan case provides a start for this yet uncharted area.

6.4.2 Transmigration

The national policy of Indonesia on population redistribution as represented in the Five-Year Developing Programmes (*Repelita*) will be discussed (Sub-section 6.4.2.1) together with its consequences for the province of Irian Jaya (Sub-section 6.4.2.2).

6.4.2.1 National Indonesian policy on population redistribution

The uneven population distribution over the islands of Indonesia can be seen to be merely determined by differences in soil quality and climate. Conditions on Java and Bali have always been most favourable for supporting a high density population as their volcanic soils are suitable for intensive agriculture. Despite these advantages in natural conditions, at the end of the 19th century the Dutch colonial authorities became aware of the fact that because of the high population pressure, Java no longer could provide sufficient food. Land holdings seemed to be shrinking and the general welfare of Java's inhabitants declined. This made the colonial government decide to develop a policy to counteract the decline in welfare, and that is why a policy of 'education, irrigation and emigration' was born in 1901. The Dutch implemented a 'colonization' programme in 1905. The main purpose of this programme was said to be the improvement of the Javanese population (Rigg, 1991, pp. 84-85). Immediately after independence, Sukarno heavily supported the emigration programme, by then called transmigration (see also Section 6.2). During the third *Repelita* (1979-84) this transmigration programme comprised as much as six per cent of the development budget (Rigg, 1991, p. 86). In the early years of the transmigration

programme (see Table 6.1) the objective continued to be the reduction of the demographic pressure on Java. Soon it became clear that this objective was not feasible and the rationale changed to regional development, food production, creation of employment opportunities, general welfare objectives, security and integration (Rigg, 1991, p. 89; cf. Hardjono, 1977, p. 7). Transmigration more and more became a means to stimulate development in the outer islands. A comparison of the number of migrants with the natural population increase of the migrant-sending areas illustrates the minor effect transmigration has on relieving the population pressure. From *Repelita* I through III about 2.5 million general (fully government supported) transmigrants settled in the outer islands while the population of Java and Bali increased by 24 million (Rigg, 1991, p. 95). Skeldon (1997, p. 169) assumes that a same number of voluntary migrants moved during the period 1979-1984 from the densely populated islands to the outer islands.

Table 6.1 **Transmigration in Indonesia's five-year development plans**

Plan	Years	Target (no. of families)	Achievement (no.of families)
Repelita I	1969-74	40,000	45,169
Repelita II	1974-79	250,000	87,800[a]
Repelita III	1979-84	500,000	535,474
Repelita IV	1984-89	750,000	272,320[b]

Source: Hugo *et al.*, 1987, p. 179.

[a] According to Mantra (cited by Van der Wijst, 1983, p. 15) only 56,272 families transmigrated during *Repelita* II.

[b] This figure relates to the first half of the period only.

Ideally, transmigrants were poor people from densely populated areas (population density of over 1,000 persons per square km), and preferable from areas where natural disasters are a constant threat, where land is in a critical condition due to erosion, or where development activities are designated (Van der Wijst, 1983, p. 5). Furthermore, preference was given to young, healthy Indonesians who were married and whose family did not number more than five members. The wife should not be more than three months pregnant, and the youngest child should be older than six months of age. Exceptions were however made for ex-servicemen. Though, in practice, these rules were less strictly applied, especially in areas where it proved hard to motivate people to migrate.

The receiving areas were selected according to soil condition, size of available land, population density, and strategic location (national security). In addition, it was necessary to ascertain that the area was free of land claims by the local population and not assigned timber concessions (Van der Wijst, 1983, p. 6).

Because of the fall in oil prices in the mid-1980s, the transmigration budget was cut by 44 per cent in January 1986. Shortage of funds was however not the only reason transmigration targets were not met. A severe problem was for instance the lack of competent managers. Another problem was that in the course of time, the cost of finding suitable transmigration areas and preparation of those sites became more and more expensive. And although figures are hard to come by, it is estimated that spontaneous migration by far outnumbered fully assisted migration under the transmigration programme, the so-called *transmigran umum* (Hugo *et al.*, 1987, pp. 184-185). Because of financial problems and resistance to the programme, the emphasis of the programme has shifted towards retrenchment and consolidation since 1987 (Rigg, 1991, p. 86). In addition, Rigg (1991, p. 106) states that 'increasing attention is being paid to spontaneous (not or partly financial supported by the government) settlers and the promotion of 'chain' migration in which relatives and friends of transmigrants move to the (transmigration-) settlements'. This is because the spontaneous settlers are thought to be more successful and less demanding in financial support (Rigg, 1991, p. 106).

6.4.2.2 Transmigration to Irian Jaya

Migrants from Java initially moved to nearby islands such as Sumatra. When suitable land became scarce in those areas, the migrants slowly moved further eastwards. The eastern islands (the Moluccas and Irian Jaya) therefore did not receive any substantial number of transmigrants during the colonial period and only around 2,000 persons during the Soekarno period. Their number has however increased significantly. During *Repelita* I, 2,198 people were settled in the Moluccas and Irian Jaya (1% of the total), by *Repelita* III this number has increased to 105,110 (6% of the total) and this has been maintained in *Repelita* IV (see Appendix 6.1, Table 1 for figures on Irian Jaya). The main focus of settlement in *Repelita* IV was Irian Jaya because Irian Jaya was a region rich in resources, with a low population density, ergo offering a lot of opportunities for poor and landless Javanese. *Repelita* IV had a target of 167,739 transmigrant families for Irian Jaya. This number would have been equivalent to about 70 per cent of the total indigenous Melanesian population. However, lack of suitable settlement areas, poor soils and logistical problems, as well as the political backlash in Irian Jaya and overseas, meant the transmigration target would not be reached. In fact, only 9,978 families were settled in the first two and a half years of the programme (Hugo *et al.*, 1987, pp. 184-185).

What made the transmigration programme attractive for the local government of Irian Jaya was that it would bring along the development of the infrastructure and the extension of the government administration, both enabling them to develop the unexploited resources. Besides, the transmigration programme included the stimulation of sedentary agriculture in order to produce food for the new settlers. Increasing the agricultural output would make Irian Jaya less dependent on the import of basic foods and effect savings on the high costs. This increase in output would result from the use of more land for agricultural purposes as well as from the transfer of the inmigrants' knowledge of new farming techniques to the mainly subsistence-oriented indigenous population (Manning & Rumbiak, 1989).

Figures from the 1980 census show that 26.8 per cent of the inmigrants in Irian Jaya came from Java (Hugo *et al.*, 1987, p. 189). The majority of other island inmigrants to the resource-rich provinces are from a few regions which have long-established traditions of outmigration, like North and West Sumatra, South Kalimantan and South Sulawesi, a tendency which, according to Manning and Rumbiak (1989), has been reinforced since 1986.

There are a fairly limited number of places of destination of transmigrants to Irian Jaya. In 1975 the city of Manokwari was the only location of the transmigration project on Bird's Head Peninsula (ESCAP, 1981). The regions where the transmigrants have settled in Irian Jaya in the period 1964-1986 are the areas around (with the estimated percentage of transmigrants related to the indigenous population in brackets): Merauke (14%), Sorong (17%), Jayapura (9%), Manokwari (16%), Paniai (Nabire, 5%) and Fak Fak (Timika, 2%) (Manning & Rumbiak, 1989, p. 100). The selection of new sites suitable for settlement areas is always difficult, particularly in Irian Jaya as localities where the soil is sufficiently fertile are rather scarce. In addition, exploitation costs are extremely high in Irian as the local demand for products of the transmigration areas is very limited and transportation costs are high.

All of the important transmigration provinces have low proportions of inmigrants settling in urban areas. It is striking therefore that in the province of Irian Jaya more than three-quarters of incoming interprovincial migrants settled in urban areas. This points to the newcomers' domination in both administration and the private sector (which provides goods and services) in Irian Jaya. Administration sector tends to be dominated by the Javanese while the distribution of goods and services is predominantly in the hands of inmigrants from South Sulawesi (Hugo *et al.*, 1987, p. 190).

Manning and Rumbiak (1989) on the other hand point out that the seasonality in agricultural production results in periods wherein the transmigrants experience a shortage in cash income, differs by location due to different climates. According to them the transmigrants move to towns during the agricultural off-season in an attempt to compensate this lack of income. As Hugo *et al.* (1987) report that more than 75 per cent of the inmigrants earn their living by working in administration or are occupied with the distribution of goods and services, the magnitude of this seasonal mobility clearly is of limited importance.

Although the transmigration programme was sometimes seen as a possible 'Javanization' of Irian Jaya, the demographic impact of the programme is far less than usually assumed (see Appendix 6.1, Table 1). From 1979-86 94,000 persons settled in transmigration sites, of whom about 13,000 were local transmigrants. Manning and Rumbiak (1989) assumed that some 20 per cent of the latter were non-Irian born, with transmigrants from outside Irian Jaya accounting for about six per cent of the total Irian Jaya population, and about ten per cent of the rural population in Irian Jaya in 1986. About one-quarter of the estimated total population increase during the period 1979-86 consisted of transmigrants from outside Irian Jaya. In selected settlement areas, the demographic impact has of course

been much greater, especially in lowland areas near the towns receiving many of the transmigrants. Even if one takes into account the offspring of the transmigrants, in addition to the flow of new migrants, and assuming an average annual number of 15,000 migrants to Irian Jaya to the end of the century, the total transmigrant population will not exceed half a million. This is about one-third of the estimated indigenous population of some 1.6 million (Manning & Rumbiak, 1989).

As has been mentioned earlier, selection of suitable sites meeting the demands such as soil fertility, proved to be difficult in Irian Jaya. Moreover, infrastructure like roads was so little developed in Irian Jaya that transmigrants faced much difficulties in selling their products and therefore, making any money. The government did however became aware of these problems. In addition, major conflicts with the indigenous population, especially over land compensation, convinced the provincial government that attempts should be made to settle these issues prior to construction and resettlement (Manning & Rumbiak, 1989).

The facilities provided by the authorities to the transmigrants, such as the agricultural sites and housing, brought about discontent among the indigenous population. One of the main factors which upset the local population was the fact that their loss of hunting sites was not compensated and the fact that some contractors made large profits from the sale of timber cut down during clearance of the sites for settlement. However in some areas leaders were quite willing to provide land for transmigrants as they appreciated the fact that infrastructure would be improved and that the local people would benefit from the new health and educational facilities. In other areas, transmigration (plans) led to more conflicts. One solution policy makers thought of was to increase the share of the new settlements reserved for local residents from 10 to 25 per cent, in order to stimulate integration. This plan however largely failed mainly due to the problems the transmigrants faced in earning a living in those places. These problems could be the lack of soil of suitable quality, new, sometimes less productive farming techniques introduced by inmigrants, and/or the poor infrastructure. Observing these difficulties, the locals opted for known means of earning a living which ensured more certainty. New farming techniques as used in the transmigration areas would not only require a change in agriculture but also in patterns of labour and socio-economic organization. Other factors such as language differences, as Javanese often is the lingua franca in resettlement areas, discouraged the local population from moving into the resettlement areas. To solve this problem, the provincial governor requested the central government to make 25 per cent of the transmigration budget available for resettlement and rural development programmes for the local population. This idea was gradually accepted and local officials reported that this programme was far more successful than attempts to encourage locals to resettle in the new settlements. It is only recently that the government started to invest in income and productivity growth of the indigenous population in order to bridge the economic gap with the transmigrants (Manning & Rumbiak, 1989, pp. 97-106).

6.5 Current patterns of migration

Migration has to be considered within its particular context in order to understand its various aspects. This is because migration patterns are not merely an outcome of preferences and wishes of migrants but they also reflect the local conditions of the place of origin and the place of destination (e.g. opportunities for work, transport facilities, legislation to move and/or settle in another community). Policy and legislation may influence migration in various ways. It may either stimulate or discourage migration in general, or it may favour certain types of migration or migrants with certain characteristics. Policies which influence migration are, for their part, not constant over time as well.

The following sub-sections deal with the various aspects of migration relevant in the Indonesian context, that is, the degree of permanence (Sub-section 6.5.1), the direction of migration (Sub-section 6.5.2), and the characteristics of the migrants (Sub-section 6.5.3).

6.5.1 Degree of permanence

Factors which influence the duration of residence in the place one moves to is the relationship of this place to its hinterland (population density, availability of rural wage labour, level of rural income) and attributes of the place itself (size, amount, and type of work), ease of access, the extent of previous migration links, and the existing policies with regard to resettlement. Furthermore travelling expenses influence the decision on the duration of absence.

The Teminabuan survey identified 470 individuals who ever moved since 1990 and who, all together, made 582 moves. The mean number of movements of this group of people is 1.24 (n=470). Those persons who at least moved twice (n=104) lived on average for 20.8 months in their new place of residence before they moved on. Circular mobility and commuting to for instance the gardens and the sago marshes are however not included in this figure. From the Teminabuan household survey we know that for 27.0 per cent (n=1,400) of the households circulation is commonly practised as a means to earn a living (horticulture is the main source of income). Of those households who circulate on a regular basis, 57.9 per cent (n=375; missing cases=3) stay overnight for a few days before they return to their village, while 39.5 per cent return once a week. Only 2.6 per cent of the households stay away for more than a week. In Teminabuan subdistrict circular migration is motivated by the fact that people usually have to travel (either walk or row) for many hours before they reach the place of destination. Staying overnight is therefore more convenient than commuting. Besides, the people are used to this fairly isolated way of living. In Teminabuan subdistrict 44.2 per cent (n=1,373; missing cases=28) of the households commute for the purpose of earning income from their most important source (farming, fishing, or hunting).

Of the respondents who are born in Teminabuan subdistrict and who at the time of the 1996 survey also live in Teminabuan, 97.5 per cent (n=2,465) also lived in Teminabuan subdistrict at the time of the 1990 census. The majority who were not living in Teminabuan in 1990, that is 1.9 per cent of the respondents (n=2,465), resided at that time in Sorong (town or nearby). It shows that 85.5 per cent (n=3,246) of the respondents never moved since 1990. Of the 470 persons identified as migrants (ever moved since 1990), 29 per cent can be classified as primary migrants and 66.1 per cent as secondary migrants.

6.5.2 Direction of migration

The decision on direction of the movement is usually based on information provided by former migrants, friends or relatives. Therefore, the choice of locations is limited by one's information network. This pattern of decision-making consequently leads to chain migration, in which people move along the path paved by former migrants. In fact, migration is predominantly chain migration (Hugo *et al.*, 1987, p. 237). This effect of chain migration can be ascribed to processes such as the 'snowballing effect': once information channels and personal links are established, the step to migrate is taken without too much effort. Visits of potential migrants to already migrated relatives and friends also play a meaningful role in the dissemination of information (Morauta, 1981; Rumbiak, 1985, pp. 211-212). Newcomers are assisted by the already settled migrants in that they are provided with food and shelter as well as help with procuring housing and work. In Jayapura family networks served as a means of finding a job, with the result that inhabitants of one village ended up in particular jobs (Rumbiak, 1985). Knowing that one will come to live among people sharing the same tongue, traditions and roots provides (chain-) migration with apparent certainties (cf. Hugo, 1997, p. 99).

The Teminabuan survey data show that this phenomenon also holds for the permanent migration to the research area. Of all the work-related migration movements to and within the Teminabuan subdistrict, in 97.0 per cent (n=197) of cases the migrants knew about the work opportunities before they actually moved. In some 46.0 per cent (n=191) of cases, the migrants were assigned a job in Teminabuan by a *dinas*, a government service which employs them. For 24.0 per cent of these work-related movements, relatives and friends served as the information channel, while in another 12.0 per cent of these movements job-hunters acted as the most important intermediate. Hugo (1997, p. 99) also noted the important role intermediate persons like job-hunters play in the internal and international labour migration in Indonesia. Job-hunters are a group of highly organized people. Church related appointments were in 4.7 per cent of the cases the channel which directed the movement. In 4.1 per cent of the job-related movements, the migrant had visited the place before which gave the opportunity for information about jobs. The media only plays a minor role in influencing the direction of the movement. Newspapers are never mentioned as such, while in 4.1 per cent of cases the radio/television was mentioned as a source of information on possibilities for jobs in the research area.

As mentioned before, short-distance movement, and therefore intraprovincial, is the most common type of migration in Irian Jaya. An example of intraprovincial migration in Irian Jaya involved migration from Teminabuan and the Schouten Isles to Sorong for the oil companies (Groenewegen & Van de Kaa, 1964, p. 75). Today there are still clusters of people from Teminabuan living in the *kampungs* of Sorong. This clearly is the result of following their predecessors (chain migration). What is very common is that children who continue schooling (beyond levels available in Teminabuan) go and live with relatives in places where more schooling opportunities are offered. Moving in is much cheaper than living on their own and it is for most parents the only possibility to afford further schooling for their children. Moreover, living on one's own is not common and for females certainly not considered appropriate. Links through family or friends are thus of major importance in directing new migrants where to go.

When comparing the places of residence at birth (defined as the usual place of residence of the mother at the time of birth) with the place of residence at the time of the 1990 census and the 1996 survey, the following results came to light. Of those aged 18 years and above and currently living in Teminabuan subdistrict, 89.3 per cent (n=3,243) were born in the province of Irian Jaya, 6 per cent came from Sulawesi (4.7% from South Sulawesi), 2.0 per cent from Java, 1.9 per cent from the Moluccas, and another 0.4 per cent were born on Sumatra. Of the 3,246 persons interviewed on migration during the Teminabuan survey, 96.8 per cent were already living in the province of Irian Jaya in 1990. A slightly lower percentage, that is 91.7 per cent (n=3,229) of the respondents were residents of Teminabuan subdistrict, Irian Jaya, in 1990.

Migrants coming from the rural areas and heading for urban areas tend to move to the nearest town and in this way gradually move on to the biggest town. Moving from town to town means in one out of two cases moving to the capital. Both Skeldon (1979b) and Walsh (1987) describe this pattern (based on PNG data). Furthermore, the direction of migration is heavily related to where the job opportunities are located. Bigger cities and new administrative centres have a growth rate which is considerably higher in comparison with smaller cities (Walsh, 1987). Nonetheless, the most important factor determining the direction of migration is, according to Walsh (1987), the kind of employer because it is connected with the kind of labour requested, that is to say, skilled or unskilled. The type of skill required depends on the kind of work offered by the employer. In addition, an important consideration is whether one can earn a living from it, or if additional income from traditional sources is needed, and if so, whether it is possible to combine the two.

Where the research area is concerned it is hard to talk of a town. It is obvious that most inmigrants settled in Teminabuan town or in the adjacent village of Wermit, where most off-farm job opportunities are located. The administrative centre and the major health services are located there, and trade is concentrated in these villages. Beyond this administrative centre, inmigrants can only be found in Waigo, where a logging company operates in an area near the village. Here, skilled labour is required as well, like people who have a driving license and/or are trained in mechanics.

6.5.3 Characteristics of migrants

The migrant population used to be heavily overrepresented by men. Also Groenewegen and Van de Kaa (1967) found that migration in the canvassed areas of Irian Jaya in the 1960s predominantly took place among men 15-29 years of age. Similarly, the data of Papua New Guinea show that in 1965 80 per cent of the migrants were below 31 years of age and only 2.2 per cent of the wage labourers were women (Curtain, 1981, pp. 189-190). Women migrated predominantly to go and live with their newly-married husbands. But over time, education, and with it wage labour, became more widespread for women. Consequently, the percentage of female migrants rose considerably. On the average, outmigrants were better trained than the non-migrants, with the exception of those who moved to the plantations to do mainly unskilled work. Inmigrants usually were somewhat less trained than the population they move into. This mainly concerned migration from the rural areas to the more urban areas. It will however be shown below that this does not hold in the Teminabuan case where in fact inmigrants usually come from a more urbanized area than the Teminabuan area they moved into. Inmigrants in the Teminabuan subdistrict are generally people from other islands of Indonesia. They came from South Sulawesi, the Moluccas, Java, North Sulawesi, and Sumatra. This means that their socio-cultural background is different from the indigenous population of Irian Jaya, and therefore Teminabuan. They come to Teminabuan subdistrict for very specific reasons. Most people from Sulawesi are traders and start a business in the subdistrict where such initiatives were lacking and opportunities available. People from the Moluccas and Java are usually civil servants, either in the local administration, the health services, or teachers at one of the secondary schools. Few indigenous people hold such a post, due to their overall lower level of education. The Indonesian census data of 1971 and 1980 also show a migration pattern of better educated people out of their village of origin. It should however be taken into consideration that these census data do not reveal short-distance movements occurring within the provincial boundaries. Unskilled labourers, food vendors and the like do therefore not appear in the census statistics (Hugo *et al.*, 1987, pp. 217-218). As has been mentioned in the section 'Data on migration', the Teminabuan survey only covers information on migrants to (therefore inmigrants) and within the subdistrict.

Pryor (1979, p. 326) has typified the characteristics of internal migrants of South-East Asian countries as: (1) being aged 20-29 years; (2) male (in the case of Indonesia); (3) a little more likely to be single than to be married; (4) belonging to a smaller family than non-migrants; (5) belonging to one or more mobile ethnic groups within the total society; (6) having a traditional sector 'source of livelihood', most likely as unskilled labourer, food vendor or pedlar; (7) having a higher level of education or number of years of schooling than the average for the community of origin; and (8) moving for employment-related reasons about as frequently as for non-employment reasons, with the presence of relatives or friends working as a key factor in determining the actual destination and possibly the timing of the migration.

Our hypothesis is that the Teminabuan migrant resembles the South-East Asian migrant as typified by Pryor. Therefore we will subsequently examine every characteristic forwarded by Pryor to see whether or not this hypothesis holds for the Teminabuan case.

1. Age
The people of Teminabuan who migrated at least once since 1990 are in 41.5 per cent of the cases (n=452; missing cases=18) of age 20-29 at the time of the survey. Extending the age limits a little, that is from ages 18 through 36, yields 75.4 per cent (n=452) of the migrants. In the Teminabuan data we deal with the age at time of interview because of which it is likely that the majority closely resembles the age group as indicated by Pryor, though the upper limit may be a few years beyond age 29. The mean age (measured at time of the survey, not at time of migration) of the migrants by sex hardly differs. Males are on average 30.9 years of age (n=255) and females 30.6 years (n=197).

2. Sex
The sex ratio of migrants indeed favour males, but not heavily. Teminabuan migrants are 56.8 per cent males and 43.2 per cent females (n=470). Compared to former times as described by for instance Groenewegen and Van de Kaa (1967) and Curtain (1981), the participation of women as migrants has grown considerably. This is likely a result of increased education levels and wage labour opportunities.

3. Marital status
The Teminabuan migrants are, contrary to Pryor's finding, by majority married (71.1%; n=460; missing cases=10). Among the female migrants this percentage is even somewhat higher, that is 75.9 per cent (n=199) in contrast to 67.4 per cent (n=261) for males. The rest are mainly single (26.3%; n=460).

4. Family size
Pryor's finding that migrants more often come from smaller families is confirmed by the Teminabuan data. Migrants belong to households with an average size of 3.54 members (n=234 households), while the average number of non-migrants household members equals 4.65 (n=1,163).

5. Ethnic group
The Teminabuan survey does not provide any information whether migrants belong to more or less mobile ethnic groups within the society.

6. Main source of household income
As the Teminabuan data merely reveals data on inmigrants and migrants migrating within the subdistrict, the picture will most likely differ from the one Pryor sketched. Pryor found that the migrants mainly worked as unskilled labourers. Data from the Teminabuan survey reveal that the main source of income for households with migrants compared to those without migrants shows significant differences on three points. First, the percentage of households whose main source of income is derived from civil service (and therefore skilled labourer) is much higher if one of the household members is a migrant compared to

when there are no migrants in the household (37.0%; n=235 to 12.8%; n=1,136). Second, Pryor's expected pattern that migrants are more often found in unskilled jobs is again disconfirmed by the percentage of households whose main source of income is farming. 17.9 per cent (n=235) of households with migrants, as opposed to 54.5 per cent (n=1,136) of households without migrants rely on farming activities (excluding beating sago). Third, households with migrants show a far higher percentage of the category 'other sources of income' (22.5%; n=235 to 2.9%; n=1,136), which consists of jobs such as motorbike driver (as a mean of public transport), employee in a shop, and truck driver.

7. Level of education

As we are only dealing with inmigrants and migrants who move within the subdistrict of Teminabuan, the average level of education of migrants can not be compared with those of the community of origin. The level of education of these migrants can however be compared with the average level of education of the non-migrants. This yields a totally different picture for the two indicated groups (hereafter called inmigrants and non-migrants). In general it can be stated that these inmigrants are on average better educated than the non-migrants, which holds for male as well as female migrants. Inmigrants are clearly less found in the lowest ranks of education, which is for instance illustrated by the fact that 13.9 per cent (n=454) have not (yet) completed primary school, compared to 41.6 per cent (n=2,731) of the non-migrants. On the other hand, inmigrants are compared to non-migrants clearly more often found in the groups who completed lower secondary school, higher secondary school, and further education (which for 90.0% (n=111) refers to education beyond the level of higher secondary school). These groups represent 15.4 per cent, 18.7 per cent, and 24.7 per cent of the inmigrant population (n=454), whereas they only represent 9.8 per cent, 5.7 per cent, and 12.7 per cent respectively of the non-migrant population (n=2,731).

8. Work as reason of movement

Together, the 470 identified migrants of the Teminabuan survey moved 582 times since 1990. In 37.5 per cent of cases (n=577; missing cases=5) these movements were work-related; the migrants either moved because of a job or moved to look for a job. Though relatives and friends play a role in these job-related movements (in 24.0% of them; n=191), for the majority (46.0%; n=191) it is due to a transfer, usually because they are in the government service.

Though the migrant characteristics as typified by Pryor are confirmed by the Teminabuan data for age and family size, the survey results show a deviant picture with concern to sex, marital status and the main source of income. The pattern of 'work as reason of movement' is in the survey area somewhat less pronounced than Pryor's typification of a migrant. Through lack of information we are unable to comment on the characteristics 'ethnic group' and 'level of education of the inmigrants in relation to their population of origin'.

6.6 Reasons for migration

The reasons for migration will be described in the following order. To start with, the reasons given in the Teminabuan survey along with the reasons presented in the studies of Rumbiak (1985) and Boyd (1981) will be laid out (a). Afterwards, the reasons for migration for the various types of migration are presented: (b) seasonal migration (as a kind of circular migration); (c) circular migration; and (d) permanent migration.

A. Reasons for migration: inside and outside Teminabuan subdistrict
An example of intraprovincial migration is the study presented by Rumbiak (1985) which describes the migration of the villagers of Nimboran to Jayapura. In Nimboran there are no real push factors present which would cause migration; sufficient food is produced and unemployment is absent. Still, the flow of migrants increased from 1950 onwards to about 1980. The Nimboran people gave the following reasons for migration. First of all they have economic considerations. Although there are many causes involved in migration, the underlying cause to move is always a financial one. One has to pay taxes or wants to purchase goods (Boyd, 1981). As mentioned before, Jayapura offers different kinds of jobs which enables one to leave farm work. Besides this, wage labour provides them with the possibility to participate in the cash economy and to purchase luxury items. These modern consumer goods distinguish them in their home village and confer a certain amount of status, apart from the utility the items provide. Schooling was another important reason to migrate. Rumbiak found that more than one-third of the migrants initially migrated for schooling purposes. Parents migrated to earn a cash income which would enable them to pay the school fees. Children and students migrated because educational institutions were highly concentrated in the urban areas. Friction between the migrant and his family or disagreement with village regulations could also be a reason to migrate. Furthermore, in Irian Jaya the bride price system is widespread. When traditional means for payment as the *kain timur* (woven cloth) were formally abolished, money - and a lot of it - became necessary to be able to meet the demands of the bride's family. A cash income consequently became a requirement for marriage as well. *Kain timur* however continue to play an important role in bride price payments (cf. Miedema, 1984, p. 89).

Below is a brief discussion of the main reasons for migration applicable to present-day Teminabuan. The following reasons are discriminated:
1. work;
2. education;
3. marriage;
4. family movement. This concerns movements other than those of newly-married couples. In the Teminabuan survey, family movement is defined as migration with the purpose of moving in with relatives, usually related to the housekeeping and/or the care of young children, etcetera. The reason why this type of movement is not categorized as 'work' is that it concerns unpaid positions. Also a woman (and children aged 18 years and over) who moved with her husband who has found employment elsewhere is categorized as 'family movement'; only the reason of movement of the man is in such cases categorized as 'work'.);

5. splitting up of settlements. In the past, displacement of settlements was also a reason to move, but this is no longer allowed by the government, at least not in the Teminabuan area. A splitting up of a settlement could result from a quarrel between families or groups within the community.

Work and education can result in permanent or circular migration, or otherwise, commuting. All other causes of migration usually result in permanent migration. Table 6.2 shows the main reasons for migration in Teminabuan.

Table 6.2 **The main reasons for migration by sex, Teminabuan 1996 (in %)**

Reason	Males	Females	Total
Work	52.2	17.9	37.6
Family movement[a]	14.2	41.3	25.5
Splitting up of settlement	12.1	15.8	13.6
Education	7.7	7.1	7.5
Marriage	2.4	11.3	6.1
Other	11.4	6.6	9.7
Total	100.0 (n=337)	100.0 (n=240)	100.0 (n=577)

Source: Teminabuan survey 1996.
[a] Family movement other than for marriage.

The order of importance of the above reasons for migration is the same for the total population as for the male population of Teminabuan. Women clearly show another picture. Work is, by far, the main reason for migration among men, whereas 'family movement', 'splitting up of settlement', and 'other' are about equal. Migration resulting from splitting up of settlements is in fact hardly age- or sex-specific as usually the whole household moves. 7.7 per cent of the movements of the male migrants are for the purpose of education, while only 2.4 per cent of their movements are because of marriage. The vast part of the female migratory movement (41.3%; n=240) concerns family movement (other than for marriage). Part of this is likely to result from work-related movement of the husband. Less than 20 per cent (17.9%; n=240) of the movements of women are a result of their work. Splitting up of the settlement is the third most important reason for female migrants to move (15.8%; n=240). Among women marriage is a more important reason to move than among men; 11.3 per cent of the movements of women are because of marriage. This is due to the custom of patrilocality. Female migrants who move because of education are about the same as male migrants (7.1%; n=240).

B. Seasonal migration

Reasons for being part of seasonal labour might be because there is no year round income guaranteed in the place of origin. As has been described elsewhere in this chapter, in some settlement areas of transmigrants in Irian Jaya (a certain percentage of which can be occupied by the indigenous population), the conditions are not sufficient to provide them with a year round supply of agricultural products. Therefore, these people move during the off-season to towns to look for work which will provide them with additional income. On the other hand, it might also be the place of destination which determines the seasonal character of the movement. If for instance plantations need only extra labour during the time of harvest, the labourers will only be offered work for this certain period. The major source of income in Teminabuan subdistrict, subsistence farming, does not require continuously high labour input. However, as crops are planted all year round, it follows that harvest time is also all year round. Besides, as households do not plant their crops at the same time, we can not speak of peak seasons in the Teminabuan area. The same reasoning which is used above when describing seasonal migration more or less applies to contract labour. In fact, seasonal and contract work differ from each other in that seasonal labour usually relates to the growing season of the crops, while contract labour is more often related to jobs which are offered only periodically, in for instance mining and oil sectors.

The level of migration can vary considerably over the years. When a company establishes its operations it attracts many migrants in its first booming years. The type of raw materials it is working with, their availability and price on the (world) market, heavily determine the duration of operations. In Sorong for example, the oil sector declined drastically when the price dropped on the world market. Instead of migration because of warfare, *hongi* raids or slash-and-burn practices, the exploitation of plantations and mines precipitated a flow of migrants to the rural non-village sector[2] in Papua New Guinea. The 1966 and 1971 census data of PNG revealed that the majority of the migrants - 47 per cent in 1966 - moved to the rural non-village sector (Skeldon, 1979b, p. 100). In 1971 the majority (46%) moved to urban centres and migration became more permanent. In 1971, 42 per cent of the migrants moved to the rural non-village sector (Skeldon, 1979b, p. 101).

During the Teminabuan survey we came across contract labour which moved to and from Teminabuan subdistrict. We came to know about most of the contract labour out of Teminabuan by chance. When we questioned ever-married women on contraceptive use before their pregnancies, the women mentioned using some kind of contraceptive before a pregnancy in 43.5 per cent of cases (n=4,973). In 3.6 per cent (n=2,165) of these cases the

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[2] The following are definitions given by Rafiq (1979a, pp. 13-14) and used by Skeldon in his analysis of the 1971 PNG census data. Urban sector: centres with≥500 persons, possessing an 'urban character' and a minimum population density of 500 per square mile. Rural non-village: separately located schools, missions, plantations, rural settlements (excluding villages), defence establishments and centres with populations of less than 500 (non-traditional centres outside urban areas). Rural village sector: villages which were administratively defined as such and which do not belong to the urban areas.

method used was abstinence, but merely because the husband was holding a job elsewhere. These figures however refer to past contract labour. There were only seven cases (0.5%; n=1,400) reported in which the husband or wife was away for work purposes. In all of these seven cases, the absent partner was still working in the province of Irian Jaya, of whom five worked in Sorong, one in Maraca, and one in Theomachy. On average the couple had been separated for 25 months.

Contract labourers who came to Teminabuan subdistrict are mainly found in the villages of Waigo and Wermit. In Waigo, a logging company contracts labourers for usually a few months to a few years on end. The labourers mainly come from Irian Jaya (26.4%; n=40), the Moluccas (22.6%), North Sulawesi (20.7%), and Java (13.2%). In Wermit a dozen labourers are, on a more temporary basis, involved in a road construction project.

C. Circular migration

Circular migration (for definition see Section 6.2) is usually a consequence of taking up a job, looking for a job, or education. Therefore, circular migrants tend to move to the bigger centres in the area they are living in as those places usually offer the opportunities for work and education (Walsh, 1987).

Opportunities related to work and schooling in Teminabuan town are still too limited for it to act as such a centre. As discussed in Chapter 3, schooling facilities are offered only till higher secondary school level. Those 18 years and older, who were selected to give details about their migration histories, have usually finished school by that age. Furthermore, most students have by then taken up permanent residence in Teminabuan town while still studying at that age. Besides, this only concerns a small number of people. Roads and transportation facilities in Teminabuan subdistrict are so poor that even if Teminabuan town would have more to offer, migration would most likely be permanent instead of circular. The circular migrants in Teminabuan can be divided in two groups. Farming activities are regularly accompanied by some kind of circular migration. In fact, in 27 per cent (n=1,400) of the households the adults stay outside the village for a few days till a week before they return to their village. Besides, (some) women from the further away located villages travel to Teminabuan town to sell their garden products regularly at the market. In this case they spend the night there and therefore only return to their home village one or two days later. This is quite an important group of circular migrants as the Teminabuan survey figures show that 51.8 per cent (n=1,400) of the households indicated that the selling of crops is their secondary source of income. Naturally, not all these households practise circular migration. For those living near Teminabuan town, commuting will suffice.

Unlike the first group (farmers) which comprises both men and women, the second group (market vendors) are predominantly women. However, circular migration is according to Rodenburg (1993) heavily overrepresented by men. This is probably true if a larger area is under consideration. Rodenburg (1993) found that one reason why women do not accompany their men to town is because men do not want to sever ties with their home area. Apart from guarding the property of their husbands, some women help to accumulate

the starting capital for the migrant, or even sell their own possessions to help finance the migration. Women sometimes even finance the schooling of the children. Furthermore, the women take care of the children and the crops. There are also women who do not want to accompany their husband as they do not see any productive role for themselves in town.

Circular migration can be seen as a strategy to survive under the present economic circumstances. In the course of time it has become necessary to earn a cash income in order to meet for instance the tax obligations, to pay school fees, buy school uniforms, or for church contributions (NB the Teminabuan market vendors). On the other hand, even for those with a regular income there is a necessity to keep up ties with the subsistence economy, particularly when there does not (yet) exist a system of social services (pension) or a network of income earners to fall back on.

One estimation is that amongst the migrants in towns (in PNG), some 7-13 per cent are short-term migrants (Skeldon, 1979b, p. 105). On average 40 per cent of the economically active people in the towns is working in the informal sector (Walsh, 1987). That the informal sector is flexible enough to absorb this labour force in addition to the fact that in this way the people have the opportunity to participate in both economic processes (subsistence and non-subsistence) has not encouraged many to settle permanently in the cities. This can be seen as an advantage as a rapid increase in employment in the formal sector is hardly likely (Forbes, 1981).

The reason why particularly shifting cultivation lends itself to circular migration is that this method of agriculture does not require a continuously high input of labour. The labour division by sex is such that men are only indispensable for a few specific jobs. Boyd (1981) found the following pattern during his research in Papua New Guinea. When taxes are introduced and goods wanted but out of reach, people participated in circular migration. When needed they returned to their home village to carry out the 'male' part of the job. Circular migration increased since the early 1960s. Since the mid-1970s the rate of migration rapidly declined again. A partial explanation is that former migrants have invested their earnings in such a way that they now earn money from selling cash crops. Only if they are not doing well in this business do they migrate again. This is however not seen as a strong argument for the profit hardly ever covers the taxes. Boyd's opinion is therefore that a simple correlation does not exist between the economic development of a village and the rate of migration. In the case of the Teminabuan subdistrict it can be argued that circular migration has increased since the 1950s. At that time the Dutch started mobilizing the dispersed population into villages, which was further stimulated by the Indonesian government once Irian Jaya became one of their provinces. As a consequence, people on average came to live further away from their gardens, which paved the way for circular migration. Besides, their way of life in their gardens is what they are traditionally used to. Moreover, what was mentioned earlier in this section about money needed for payment of contribution, taxes, and the like, has also stimulated circular migration. Not only do people circulate to earn money, some families visit Sorong so regularly that one in such cases one can almost speak of circular migration to spend money on household goods (some products are considerably cheaper in Sorong than they are in Teminabuan). In

Sorong they stay with relatives or with former fellow villagers. Next to the money needed to pay taxes, fees, etcetera, consumer goods available in the shops of Teminabuan and Sorong makes people want to purchase them. This again makes people eager to earn money and encourages (temporary) labour migration.

The major reason why circular migration was able to expand so enormously in Papua New Guinea was the tremendous expansion of the public transport system between 1970 and 1980. For (semi-) permanent migrants the costs of movement hardly play a role in their decision to move or not. For circular migrants and commuters it definitely is a matter of consideration. This is also the reason why the flow of (permanent) migrants from Nimboran to the relatively nearby city of Jayapura decreased since the 1980s (Rumbiak, 1985). First of all the larger numbers of migrants flocking into Jayapura from all directions outstripped the availability of work. Secondly, public transport made it possible to commute or circulate instead of becoming a permanent migrant. On the other hand, availability of transport also provided the chance to start a commercial enterprise from the home village as surplus products from the land could now be easily transported to town. Besides, the preference of the migrant (family) to either circulate or take up permanent residency was also influenced by other factors than transport facilities and costs alone. Another reason for not moving permanently to town was that the rural population did not have a legal status to do so (during the colonial period) and was therefore forced to travel back and forth (Groenewegen & Van de Kaa, 1964, p. 75). Furthermore, circular migration has been partly a consequence of the policy of employers because they hardly ever provide family accommodation. Of the married male migrants 31 per cent lived together with their wife in the city (1966). In the rural non-village sector this was only 20 per cent (Curtain, 1981, p. 189).

D. Permanent migration

During the 1996 Teminabuan survey people were considered permanent migrants if they had no intention to return to their place of origin, at least not within six months after departure (cf. Forbes, 1981).

Permanent migration is the type of migration which is most suitable for family migration. The population of permanent migrants is therefore more heterogenous with respect to age than migration with a lesser degree of permanence.

Reasons for migrating permanently can be diverse as shown by the following:

a) The type of employment one is skilled in is not to be found in the place of origin, and therefore the migrants have no reason to return. This especially applies to highly educated and/or highly specialized persons.
b) Besides this, once people are accustomed to city life, they usually do not express any eagerness to return to their home town, which is considered to be somehow backward. This also plays a role amongst the more educated youth in Teminabuan who moved to Sorong or Jayapura for education. Returning to their home village and in particular to the village lifestyle is considered a step backwards.

c) In case a large part of the family has migrated, the support system at old age is now to be found in the city, in particular when one's children are also living and working in the city. In Indonesia people still depend on the family for care in their old age. In case they do draw a pension, this usually is insufficient, particularly when inabilities increase the cost of living.

The permanent residents of Teminabuan subdistrict are analyzed by their place of origin. The 1996 Teminabuan survey data show that of the current adult (≥ 18 years of age) inhabitants of Teminabuan subdistrict, 77.4 per cent (n=3,186) are also born in this subdistrict, while as many as 89.3 per cent (n=3,243) are, disregarding their subdistrict of birth, born in the province of Irian Jaya. The other major areas of origin for lifetime migrants in Teminabuan are: Sulawesi (6.0%; n=3,246), Java (2.0%), the Moluccas (1.9%), Sumatra (0.4%), and elsewhere (0.4%). On the other hand, 85.1 per cent (n=2,895) of the adult population currently living in Teminabuan subdistrict and who are also born in the province of Irian Jaya come from Teminabuan subdistrict. The rest of them come from the subdistricts of Ayamaru (3.8%), Inanwatan (3.1%), Aytinyo (2.0%), Sorong (1.4%), Aifat (1.2%), and elsewhere (3.4%). The above-mentioned subdistricts are all located on the Bird's Head Peninsula and, except for Sorong, border the Teminabuan subdistrict.

From the 1996 Teminabuan survey only data on permanent outmigrants are gathered as far as it concerns husbands or wives, and in the case of unmarried children living permanently elsewhere. To describe the first group, that is, couples where one partner permanently lives in Teminabuan subdistrict while the other permanently lives outside Teminabuan subdistrict, it should be understood that this involves a small number of people (n=29). Because of these small numbers, the results should not be looked upon as general facts. The characteristics of these migrants are as follows. The mean duration of absence at the time of the survey is 27.8 months (n=26), whereas 30 per cent has been away for between six to twelve months. The median travelling time to the place of destination is two full days. Seventeen of these migrants move within the province of Irian Jaya, of whom about half (8) went to Sorong, while three went to Jayapura. These are the very places in Irian Jaya which offer both work and schooling opportunities. From those couples where one partner is living outside Irian Jaya, six live in Sulawesi, four in Java, whereas another two reside on the Moluccas. Those living outside Irian Jaya in general come from provinces other than Irian Jaya. The main reasons for separation is that they still own a house in the place of origin which has to be looked after (8 cases), that one of them has a job elsewhere (7 cases), or that they prefer to continue their children's education in the place of origin (5 cases). Four couples have separated because one of them wanted to continue studies. In this case, the partner who came to Teminabuan is the migrant.

In total 16.3 per cent (n=1,401) of the households have unmarried children living permanently elsewhere. The main reason for moving out is education (in 79.4% of cases; n=321; missing cases=1). Most of these children (83.5%; n=322) moved to a city within the province of Irian Jaya. Those households who have unmarried children living elsewhere have on average 1.4 children living permanently away from them. By majority

(69.6%; n=322), these children are male. Their ages range from 7 to 43 years of age, with a median age of 21.00 years. Most of them (75%; n=316) are in the age group up to and including 25 years of age. Compared with the general population aged six and over, the educational level of the migrant children is, as to be expected, much higher (see Table 6.3).

Table 6.3 **The general population (≥6 years of age) and the population of unmarried children who permanently live away from their parents by level of education completed, Teminabuan 1996**

Level of education completed	General population ≥6 years	Unmarried children not living with their parents
Not (yet) completed primary school	52.1	5.3
Primary school	24.0	24.2
Lower secondary school	8.7	29.8
Higher secondary school	5.1	35.1
Other	10.2	5.6
Total	100.0 (n=5,056)	100.0 (n=322)

Source: Teminabuan survey 1996.
NB The figures are not standardized for age.

As many of these children move away to continue higher education, it is obvious that they have completed either lower or higher secondary school. Next, a group of children move out of their home village to be able to go to secondary school. The survey data indeed show that 79.4 per cent (n=321) of this population originally moved out to continue studies though some might have finished by now and subsequently found employment. Another 10.6 per cent left for the purpose of work, while 5.9 per cent moved to live with, and usually to help out with the housekeeping in the homes of relatives. Places of destination within the province of Irian Jaya are: Sorong (43.3%; n=322), Teminabuan town (15.5%), Jayapura (12.7%), Manokwari (5.3%), and elsewhere in Irian Jaya (6.8%). The main destinations outside Irian Jaya are: Java (5.3%), Manado (North Sulawesi; 5.3%), Jogjakarta (2.8%), and elsewhere (3.1%)

6.7 Consequences of migration

With regard to the population characteristics, migration can have consequences for the population of origin as well as for the population of destination. Here again, the size of the area under study is important for the results. After all, on a national scale age and sex

distribution will hardly be affected by migration as most migration takes place within a country. The population characteristics can be influenced by the type of migration which is most prevalent in the research area as well as by the specific characteristics of the migrants. For the latter, cultural factors such as the division of labour by sex or the attitude towards single female migrants also play a role. The next three sections will deal with the subjects which are relevant for the Teminabuan area and/or which we came across in the region. Sub-section 6.7.1 deals with the effects of seasonal migration. Sub-section 6.7.2 examines the question of whether migration has affected the population distribution (by age and sex), and if this effect is different for the five clusters. In Chapter 2 an account has been given for the selection of the five clusters in the research area. To describe them here again shortly: cluster I is the eastern region around Waigo, cluster II refers mainly to Teminabuan town, cluster III indicates the south-eastern area around Konda, cluster IV is the south-western coastal area, and cluster V refers to the hill area. We have chosen to analyze the population effects of migration at the cluster level as it is plausible and interesting to see if its specific location, and its degree of isolation, results in a different pattern for the five clusters. Variations in population effect which, with analysis only at subdistrict level, might otherwise have gone unnoticed. The last section (Sub-section 6.7.3) deals with the socio-economic consequences of migration.

6.7.1 Seasonal migration resulting in seasonality of births

Scaglion (1978) studied a horticultural group in Papua New Guinea of 557 persons for their birth pattern. Although birth seasons of extended periods are usually explained by non-cultural factors, Scaglion found a significant birth season in the Western Abelam Village which non-cultural factors such as temperature or humidity could not explain as these are relatively constant. Temporary limited highs and lows are on the other hand often explained by cultural factors. Scaglion found the main underlying cause for the birth season to be culturally determined. Ritual beliefs accompanying the growth of ceremonial yams encouraged a six-month period of sexual abstinence which resulted in a quite clearly defined birth season. Apart from these beliefs it happened to be that during the growing season of the yams, the men usually spent a lot of time in their gardens, which are sometimes located far away, and they therefore do not always return to the village for the night. As a consequence, wives and husbands have less frequent sexual contact. Another interesting incidental circumstance is that many of the women are in their third trimester of pregnancy at the beginning of the planting season or still recovering from a delivery. Therefore, the likelihood of many women becoming pregnant is reduced during the planting season when the sexual taboos are in effect. This reinforces the cyclic nature of deliveries in this group. This phenomenon does however not hold true in the Teminabuan subdistrict. As has been described in Chapter 3, the climate in Teminabuan is fairly constant and we therefore can not speak of a clear-cut planting and/or a harvesting season. The farming households plant and harvest throughout the year. Besides, usually the man and the wife go together to work (and stay) at their garden or sago marsh. From the Teminabuan survey data (because of lack of accuracy in day and month of birth of all recorded births, and due to the small numbers of the better documented births since 1995;

n=204 in 1995) specific months, or a range of months, during which there was a noticeable increased level of births were not apparent. Besides, as has been outlined before, there are, at least on community level, no labour input peaks by season to be found in the Teminabuan subdistrict.

6.7.2 Change in population composition

In the canvassed areas of Irian Jaya (Groenewegen & Van de Kaa, 1967) about 60 per cent of the total population was living (again) in its place of birth. This does however not evenly apply across all age groups as the percentage is lower for older women and the age group 15-30 years. The older the people are, the higher the chance that the person is born outside her/his current place of residence. This tendency is stronger among women than men. Young (1987a, p. 304) found that 77.3 per cent of the women had migrated because of traditional reasons such as marriage. The youngest age groups usually move with the whole family.

In PNG only a small percentage of people is actually born in a town. Compared to the national mean, the populations in towns comprise fewer children, more older teenagers (for education) and working-age adults and fewer older people, especially older women (Walsh, 1987). Walsh's findings on PNG concur with those of Groenewegen and Van de Kaa (1964) for Irian Jaya as far as it concerns working-age adults. Instead of fewer children compared to the national mean, Groenewegen and Van de Kaa however speak of more children - born to the large group of working age adults. For Teminabuan no comparison of the age distribution could be made between the urban and the rural areas because there is not a single settlement of considerable size with the characteristics of a town.

With concern to the permanent out-migration of partners in the Teminabuan subdistrict, it can be said that even if these migrants were all of the same sex, the percentage is so low that it would not affect the population distribution in any way. The largest type of migration in Teminabuan subdistrict, circular migration, has been described elsewhere (cf. Sub-section 6.7.1) as not sex-specific. Therefore, in the areas where circular migration is very prominent, it does not influence the household composition.

It is interesting to analyze the distribution of the migrants over the Teminabuan subdistrict. To see whether there are differences between the various sections of Teminabuan subdistrict, we use the five clusters as identified in Chapter 2. First, on the basis of the 1996 Teminabuan survey data, the distribution of the general population (population 18 years of age and over, as this is the population prone to migrate) over the five clusters is compared with the distribution of the 'migrant' population (see Table 6.4).

Comparing the shares of population A and population B for each separate cluster shows that the populations differ significantly in clusters I, III, and V. This means that the area of cluster I (the eastern region around Waigo) probably receives many migrants and/or has a

relatively mobile population, whereas the adult population in the areas of clusters III and V (the south-eastern area around Konda and the hill area, respectively) migrate relatively less frequently and/or have more outmigrants compared to inmigrants.

Table 6.4 **Share of the adult population (≥18 years of age) in the general population (population A) and among the population who have migrated at least once since 1990 (population B), by cluster, Teminabuan 1996**

Cluster	Population A	Population B
Cluster I	9.2	17.0
Cluster II	34.5	39.6
Cluster III	12.4	4.0
Cluster IV	21.7	27.9
Cluster V	22.3	11.5
Total	100.0 (n=3,248)	100.0 (n=470)

Source: Teminabuan survey 1996.

Second, the household distribution over the five clusters of the general population is compared with the distribution of the households who have at least one unmarried child living permanently elsewhere. Table 6.5 presents the percentage distribution of the households over the five clusters.

Table 6.5 **Share of households in the general population (population A) and households who have at least one unmarried child living permanently elsewhere (population B), by cluster, Teminabuan 1996**

Cluster	Population A	Population B
Cluster I	11.0	8.3
Cluster II	34.7	39.0
Cluster III	11.4	5.3
Cluster IV	21.4	16.7
Cluster V	21.5	30.7
Total	100.0 (n=1,401)	100.0 (n=228)

Source: Teminabuan survey 1996.

Comparing the distribution of households with at least one unmarried child living permanently elsewhere with the distribution of the general population shows that only in the clusters III (south-eastern area around Konda) and V (hill area) does the observed value for population B significantly differ from population A. With regard to the hill area this is understandable as this area is the most remote area of the subdistrict. Hence, commuting or circular migration for the purpose of education - the main reason for unmarried children to leave the parental house - is absent. 21.5 per cent of the households of the general population are found in cluster V. 30.7 per cent of households with at least one unmarried child living permanently elsewhere are located in this cluster. Konda and its surroundings show a significantly lower percentage of households with an unmarried child living permanently elsewhere. For children of the villages Bariat and Menelek it is possible to circulate or even to commute to Teminabuan town. From the villages Konda and Wamargege this is only possible if the family has a motor proa, of which are only a few. What may play a role is that the people from this area share a sea-faring tradition, in which case they usually accompany the whole family. This already impedes the school attendance at primary school.

6.7.2.1 Population distribution by age

The percentage of the adult population who ever moved since 1990 is highest in cluster I (28.5%; n=298). The figures for clusters II through V are respectively 17.3 per cent (n=1,119), 5.0 per cent (n=402), 19.4 per cent (702), and 8.2 per cent (n=722). For the total subdistrict it is 14.4 per cent (n=3,243) (Teminabuan survey 1996). The highest clustering of migrants is found in the age category 12-31 years, which involves 92.8 per cent of the migrants in the whole subdistrict of Teminabuan (Teminabuan survey 1996).

Table 6.6 presents the five-year age distributions for the populations of the separate clusters and the total Teminabuan subdistrict. To see whether the age distribution of any of the clusters differs significantly from the total population, only the age groups up to age 45 are taken into consideration because of the small number at ages 45 and over. This is justifiable as we have seen that most of the migration takes place well before age 45. The overall picture indicates that only the age distribution of cluster I significantly deviates from the overall picture. When analyzing it at age group level, it shows that the age groups 10-14, 25-29, and 30-34 significantly differ from the total population, in the sense that in cluster I the age group 10-14 is underrepresented while the age groups 25-29 and 30-34 are overrepresented. As the highest percentage of movers is found in cluster I, it was also likely that the greatest 'disturbances' in the age distribution would occur within this cluster.

Table 6.6 **Age distribution of the Teminabuan population, by cluster and for the total population, Teminabuan survey 1996 (in percentages)**

	Cluster number					
Age group	I	II	III	IV	V	Total
0-4	14.7	15.5	18.8	17.1	15.7	16.2
5-9	16.2	13.1	14.2	13.7	12.6	13.5
10-14	9.0	14.4	11.0	10.8	11.5	12.1
15-19	6.8	10.9	6.6	8.8	6.2	8.6
20-24	8.3	7.2	8.2	8.5	7.1	7.7
25-29	11.2	7.9	6.6	7.8	8.1	8.0
30-34	11.2	7.5	8.6	8.5	8.7	8.4
35-39	7.2	6.5	7.3	6.9	6.9	6.8
40-44	4.4	4.5	4.3	4.3	5.1	4.5
45-49	2.9	3.3	2.5	3.9	4.3	3.5
50-54	3.7	4.3	5.1	3.7	5.7	4.5
55-59	1.5	2.1	1.9	2.7	3.7	2.5
60-64	1.3	0.8	2.2	1.3	0.6	1.1
65+	1.7	1.7	2.7	2.0	4.0	2.0
Total	100.0 (n=544)	100.0 (n=2,285)	100.0 (n=770)	100.0 (n=1,336)	100.0 (n=1,265)	100.0 (n=6,200)

Source: Teminabuan survey 1996.

6.7.2.2 Population distribution by sex

Increased mobility and increased levels of education of women are known to have influenced the sex ratio of migrants. Another thing which can be mentioned is the influence of the mission in the 1950s. The missionaries disapproved of marriages of girls at an early age as well as polygamy. To discourage early marriages, they prolonged the school attendance period of girls (Groenewegen & Van de Kaa, 1964, p. 75). Together with the fact that money was required to pay the bride price, for which the future husband had to save hard, the age at first marriage went up for both partners. Young men had to migrate in order to earn enough to pay the bride price. Young, educated women now had

time before their marriage to look for a job elsewhere for which they were qualified. Rodenburg's (1993) findings follow naturally from what was just mentioned. She also observed an increase in educational participation of women in Sumatra which influenced the sex ratio of the migrants. In the past, parents did not consider the education of females a sound investment as their daughters would move in with their husband's family once they got married anyway. Only well-to-do families might have seen it as a way of finding a suitable son-in-law, preferably one with a white-collar job. Nowadays, parents realize that educated daughters are able to find a well-paid job themselves. According to Rodenburg it is indeed generally accepted that women should be educated as well but parents still consider a too high level of education undesirable for there would be a very small marriage 'market' for their daughters. In other words, they would just become too expensive.

Looking only at the sex distribution of the adult (≥18 yrs) Teminabuan population who ever moved since 1990, a small male dominance can be observed (see table 6.7). 16.6 per cent of the male population aged 18 and over (n=1,604) compared to 12.3 per cent of the female population aged 18 and over (n=1,640) moved once or more since 1990 (to or within Teminabuan subdistrict).

Table 6.7 **Sex distribution of the general population (population A) and the population who has migrated at least once since 1990 (population B), aged 18 and over, by cluster, Teminabuan 1996 (in %)**

	Population A			*Population B*		
Cluster	Males	Females	Total	Males	Females	Total
Cluster I	53.8	46.2	100.0 (n=299)	70.0	30.0	100.0 (n=80)
Cluster II	50.0	50.0	100.0 (n=1,119)	57.0	43.0	100.0 (n=186)
Cluster III	50.2	49.8	100.0 (n=402)	52.6	47.4	100.0 (n=19)
Cluster IV	47.1	52.9	100.0 (n=704)	51.9	48.1	100.0 (n=131)
Cluster V	48.2	51.8	100.0 (n=724)	50.0	50.0	100.0 (n=54)
Total	49.4	50.6	100.0 (n=3,248)	56.8	43.2	100.0 (n=470)

Source: Teminabuan survey 1996.

On the basis of the Teminabuan survey, the sex distribution of the population aged 18 and over of the individual clusters is compared to the overall sex ratio for the Teminabuan survey population (≥18 yrs) as well as the sex distribution of the adult 'migrant' population. The overall population of age 18 and over is 49.4 per cent male and 50.6 per cent female (n=3,248; see Table 6.7).

The sex distribution of the general population is about even, while the distribution of the 'migrant' population slightly favours males. Especially the sex distribution of the migrants in cluster I, where work-related migration is prevalent, is very much inclined to males.

6.7.3 Socio-economic consequences

According to Hugo the social impact of circulation is very mixed. Sex selective migration creates problems for villages when raising labour for special projects. Furthermore, problems occur when (educated) village leaders need to be selected. The absence of young people influences the social climate. Besides this, it has been shown that the return of a better-educated, more respected group of migrants with new ideas for the village was an insufficient compensation for the social dislocation caused by outmigration (Forbes, 1981, p. 54). During the colonial rule in Irian Jaya, these disrupting effects of predominantly male migration were taken into account, as otherwise the burden for the ones staying behind would become too heavy. There was a recruitment ordinance in effect which prescribed the maximum number of men who could be recruited from the specific settlements. Spontaneous migration could of course not be controlled by this regulation. Hence, measures were taken to regulate this flow of migrants as well. Migrants coming to Hollandia were for instance sent back to their home village if they did not hold a legal residence permit (Groenewegen & Van de Kaa, 1964, p. 75).

Migration frequently is a family decision. A reason for having just one member of the family migrate for work is that in this way they, the family, gets the biggest return of it. Individual members can live under poorer conditions than would be sustainable for the whole family. Besides, in the case of Java, and also in other areas like North Sumatra (Rodenburg, 1993, p. 62), neither wage labour nor agricultural work provided enough income to support the family. Even if their land provides enough to live on, costs for education put such a heavy burden on the resources of the families that they prove insufficient. Unable to accumulate enough cash income in the village, the people see no other option than to move out. By maintaining the links with the village of origin, a person is assured of a place to turn to in case income earned elsewhere decreases or in old age (risk aversion). These links are consolidated by the remittances sent back by the migrant. Different expenditure patterns are found for the earnings of men (migrant) and women. Basic necessities such as food, clothes and medicines are covered by the wife's income, whereas the so-called extras such as (higher) education, school uniforms, books, taxes, clan rituals, dowries, and occasional gifts are paid for with earnings made by the man (Rodenburg, 1993, p. 187; Rumbiak, 1985). Family ties and the support system surrounding them are important aspects of village life in Indonesia.

It is not merely a town in itself which attracts educated persons, but as has been said earlier, also the kind of labour needed by the employer. Still, the overall tendency is that the most productive and best trained people migrate, except for the ones who go to work on plantations. This migration pattern results in a brain drain from the home villages, no matter how little education migrants might have. Some are of the opinion that with this kind of migration, new ideas are spread most quickly over the country. The remittances the migrants send, together with the knowledge they pass on the others when they (temporarily) return to their village facilitate this. Hugo (cited by Forbes, 1981) therefore suggests that circular migration should be stimulated in order to speed up the spreading of ideas. Forbes favours a more equal development of the country so migration will decrease automatically (cf. Groenewegen & Van de Kaa, 1964, p. 76).

In Indonesia in general, there is indeed a flow of money and goods (remittances) to the rural areas. Commuters contribute as much as 60 per cent to the rural household income whilst circular migrants contribute some 50 per cent to the total household income (Forbes, 1981, p. 53). Most commuters were employed on a full-time basis in urban areas. Circular migrants also worked in their village, and their urban participation was thus more intermittent. Among the permanent migrants, 52 per cent had brought back or sent money and 62 per cent had brought or sent goods. On the average, these remittances made up 11 per cent of the income of the migrant's household of origin (Hugo *et al.*, 1987, p. 241). A small part of these incomes is spent on productive investments. Most of it is spent on food, clothing, housing and education (cf. Sub-section 6.5.2 on circular migration). Whether commuting and circular migration have the effect of levelling the differences in the spread of capital over the country or whether it just accentuates this dissimilarity has not yet been studied in detail (in 1982). Above all, it is very difficult to obtain reliable figures if at all on flows of remittances. Only money which is channelled through the banks can be traced which however is just a fraction of all the money (in cash or goods) brought back to the place of origin. An individual short-term migrant profits from migration (ideas and material), a point which would imply that this form of migration should be stimulated. On the other hand these migrants provide the towns with very cheap labour at very low costs - for schooling, health care, etcetera, they still depend on the rural village - it remains therefore very profitable for companies to invest just in the cities. In this way the differences will only increase.

As has been mentioned earlier in this chapter, the number of migrants who came to Teminabuan and could be questionned as such is very limited. It is clear however that these better-educated people (compared to the population they moved into) do not acquire much more knowledge from which, in case they (temporarily) return to their place of origin, 'their' community could profit. On the other hand, it is not unlikely that they spent part of their income in their place of origin. Many migrants who moved to Teminabuan subdistrict came to take up jobs in the local administration, the schools, or as entrepreneurs. In fact, the civil service is the main source of income in as much as 36.1 per cent (n=235) of the households in which at least one member is identified as a migrant. Information on remittances sent to their places of origin is not available.

Permanent outmigrants from Teminabuan are only represented in the Teminabuan survey as far as it concerns one of the partners of a couple still living in Teminabuan subdistrict (n=7) or unmarried children living permanently elsewhere. As the latter by majority move for educational purposes they are irrelevant when looking at remittances in the form of cash and goods. If one of the partners works elsewhere, (s)he most likely will bring back remittances to Teminabuan, though the value is unknown. Due to the small number involved, the effect of remittances will most likely be limited to the family itself.

6.8 Summary

As mentioned at the beginning of this chapter, the census is the most often used data base for migration analyses. The census however only reveals data on long-distance (inter-provincial) and long-term migration. In the research area migration used to be short-distance, and except for the purpose of marriage, short-term. Nowadays, most migration still is intra-provincial, and thus by definition, short-distance (which however can be quite far). Excluding circular migration to the gardens and sago marshes, this means that current migration in the research area is usually short-distance, but permanent (>6 months). Prevalence of short-distance movement is affirmed by the fact that 89.3 per cent of the adults residing in Teminabuan subdistrict are born in the province of Irian Jaya. For migration data we therefore heavily rely on the Teminabuan survey data as census data only cover inter-provincial migration. In Indonesia migration is very much influenced by the presence of transmigration sites. As they are absent in Teminabuan subdistrict, traditional patterns of migration still have the upper hand.
The Teminabuan survey identified 470 persons as migrants (=14.4%; n=3,246), who together made 582 movements since 1990. The main reasons for migration in Irian Jaya used to be: warfare, *hongi* raids, and marriage, whereas nowadays the reasons, within and to Teminabuan are due to: work (37.6%), family movement (25.5%), splitting up of settlement (13.6%), education (7.5%), and marriage (6.1%). Work is the most important reason for men (52.2%), and family movement the most common reason for women (41.3%) to move.

The most common type of migration in Teminabuan subdistrict is circular migration to gardens and sago marshes. 27 per cent of the households mentioned this as the way to earn their income. This type of migration is short-distance and short-term. Besides, circular migration (of women) occurs frequently for the purpose of selling products on the market in Teminabuan. 51.8 per cent of the households mentioned this as their secondary source of income (though not all need to circulate, depending of the distance of the village to Teminabuan town). Circulation, in fact, provides a way to have a stable food supply combined with a fluctuating cash income (market vendors). In this way required items (e.g. school uniforms) can be bought and obligatory payments met (school fees, church contribution). Large numbers of circular migrants (and commuters) are aided by cheap (public) transport facilities. In Teminabuan circular migrants travel either on foot or by proa (rowing, without motor), so there is no pressure to limit the number of such movements. The fact that a short-distance kind of migration prevails in Teminabuan is

probably heavily related to the physical environment (cf. Sub-section 3.2.3). With an area which is so difficult to access, and therefore lacking good infrastructure, short-distance migration is the only option.

In general, the direction of migration is mainly based on information of former migrants, friends, or relatives. This leads to chain migration. This indeed plays an important role with the permanent migration to Teminabuan as well, though the employer is the main driving force (in 46% the migration results from change in the place of work), and 'only' 24 per cent of the migrants were informed by family or friends. Job-hunters account for 12 per cent of the migrants. The media only plays a minor role as information channel (4.1%).

Similar to Pryor's findings, most migrants are young (on average 30-31 years) and belong to smaller households compared to non-migrants (3.5 and 4.6 members, respectively). On the other hand, the division by sex has over time become more even: 56.8 per cent of the migrants are male, whereas 43.2 per cent are female (instead of mainly men). Besides, migrants are now by majority married (71.1%) instead of single. Where Pryor found migrants mainly to be unskilled, Teminabuan data show that the inmigrants are specifically skilled. Therefore, these permanent migrants bring along knowledge as they are often found in jobs like secondary school teacher, in administration, or business. In this way they stimulate the local economy and contribute to an increase in the general level of education. This is contradictory to the brain drain Pryor portrayed as a result of the outflow of skilled persons.

The data in Tables 6.4 and 6.5 show that the most isolated areas of the subdistrict, for instance the hill area, have fewer migrant movements than would be expected on the basis of their population share. It is most likely that these areas attract no or only few inmigrants. In the area around Waigo migration is relatively more frequent, which is probably the result of the work-related migration to this area. The transmigration site in the adjacent subdistrict of Aytinyo most likely is the cause of the work-related migration in the Waigo area. Here, also the age distribution significantly differs from that of the total survey population. It is most likely that more than the average number of teenagers left for educational purposes whereas those belonging to age groups 25-29 and 30-34 (young working age), moved more than average to and/or within this cluster. As to be expected, men are overrepresented among the migrants in/to this area.

Chapter 7 Population dynamics

7.1 Introduction

Birth, death, and relocation represent major life events, be it in modern Western Europe or in the traditional society of the research population: they constitute the three milestones in anyone's life. Choosing a partner, opting for parenthood, caring for children and protecting them and other close relatives from illness and death, as well as making decisions about a move and facing the attendant adjustments are part and parcel of life. How we deal with these 'challenges' is partly determined by the society we live in, the norms and attitudes present, as well as the restrictions placed by society on our options. Prevalence of disease, availability and accessibility of health services, educational facilities, and work opportunities all set constraints on the individual's ability to influence the outcomes of birth, death and migration. The specific combination of the above factors, together with individual volition, determine the final result. To understand the demographic features of fertility, mortality, and migration therefore demands more than a mere reproduction of numbers. It requires a study of the background variables of each of these features. This study addresses the direct and indirect determinants of fertility, mortality, and migration. Due to time and financial constraints, background variables such as perceptions and attitudes received little attention because this would require additional research.

This study represents the demographic module of a larger multi- and interdisciplinary study of the Bird's Head Peninsula of Irian Jaya, the ISIR programme which combines anthropological, archaeological, (ethno)botanical, development administrative, demographic, geological, and linguistic research of the area. For the demographic study the survey research method was used as a tool to obtain the necessary data to document the population dynamics of the Teminabuan subdistrict. To this end, mortality, fertility, and migration are examined and analyzed within the scope allowed by the survey data. First, the four research questions as stated in the introductory chapter, are discussed below to ascertain the extent to which these questions have been answered, followed by a summary of the main research findings.

7.2 Research questions

Presented below are the research questions of this study and a discussion of the extent to which they are answered.

The four main research questions of this study are:

1. *What are the levels of fertility and mortality, and what are the patterns of migration of the population in the southwestern part of the Bird's Head Peninsula of Irian Jaya?*

2. *How does mortality, fertility, and migration affect the composition of the population?*

3. *How does the demography in the Bird's Head Peninsula compare to the demography of Indonesia and Papua New Guinea?*

4. *What is the most effective way demographic and health data can be collected on a large scale, in an area with limited accessibility and a highly mobile population?*

In addition, we explored ways to exchange and integrate knowledge with the fields of anthropology and development administration.

1. *What are the levels of fertility and mortality, and what are the patterns of migration of the population in the southwestern part of the Bird's Head Peninsula of Irian Jaya?*
   Mortality indices, with emphasis on infant and child mortality, were calculated or estimated when the observed data proved insufficient (Chapter 4). Mortality is studied in terms of age and causes of death. Fertility (Chapter 5) is described by using crude and adjusted fertility measures. Bongaarts's model is applied to unravel the constituents of fertility. Migration (Chapter 6) is analyzed according to patterns, reasons, and consequences.

2. *How does mortality, fertility, and migration affect the composition of the population?*
   Mortality was characterized by high infant and child mortality. This resulted in a distinct reduction of the age groups covering childhood. Fertility was relatively high and, what is important, constant over time. A broad population base is therefore guaranteed. Migration was prominent, though the main type of migration was circular migration which does not involve a permanent move. This type of migration therefore did not influence the population composition. The numbers of in- and outmigrants were limited and as they are quite similar with regard to their age and sex, they had little effect on the population composition. However, those children who migrated to continue education elsewhere create a dip in the population pyramid. Some of them will however return once their schooling is completed.

3. *How does the demography in the Bird's Head Peninsula compare to the demography of Indonesia and Papua New Guinea?*
   The Teminabuan survey data have, with respect to mortality, fertility, and migration, been compared with similar data on Indonesia and, often, Papua New Guinea (PNG). The 1994 Indonesian Demographic and Health Survey proved a very useful and recent source of information on fertility aspects in particular, and mortality aspects to a somewhat lesser extent. Unfortunately, the 1996 DHS data of PNG were not available at the time of the research. Survey data and relevant case studies of Irian Jaya, Indonesia and PNG were used for comparison. Indonesia was selected as the main reference because Irian Jaya is part of Indonesia and relatively little is known about this province which makes for interesting comparison of the findings (see Section 7.3). PNG was selected because the area shares much resemblance with Irian Jaya. Also, both populations have much in common with respect to race, traditions, and customs.

4. *What is the most effective way demographic and health data can be collected on a large scale, in an area with limited accessibility and a highly mobile population?*
As discussed in Chapter 2, the study area was divided into five clusters, based on a feasibility study. This division was made on the basis of physical features (e.g. type of soil, presence of clean drinking water), that were assumed to influence the living conditions and therefore, the demographic processes. From each cluster, several villages were selected on the basis of characteristics such as the accessibility of health services, schools, market supplies and trading opportunities, to represent the cluster. In turn, the survey villages taken as a whole represent the research area of Teminabuan subdistrict. By selecting a representative sample of the population to survey, we reduced the amount of organization required and, consequently, saved on time and money.

Highly valued in any survey research is the willingness of the population and the local officials to cooperate. Cooperation ensues if the right persons are contacted and involved at the right time. In light of the high mobility of the population it was very helpful to have the population directly informed before hand to elicit their support. Smooth information channels were indispensable to gather the population at the time of the actual survey. If this failed, too much time would be lost waiting for the respondents to return home or the rates of non-response would become unacceptably high. Engaging local female assistants worked extremely well for several reasons. First, it created goodwill among the population to have their own fellow villagers in this survey programme. Second, the assistants' knowledge of the local customs and traditions were very beneficial in planning the logistics. Third, interviewed by fellow villagers, the respondents willingly and openly answered the questions and were patient with the assistants, especially in the first survey villages when the survey routine was not yet well established. Fourth, access to the local dialects, which varied over small distances, was possible because the assistants came from different areas of the subdistrict. If required, the people could be addressed in their own particular dialect. Fifth, as the assistants were regarded as ordinary villagers without any particular status, respondents and assistants found each other equal interlocutors which made the conversations more comfortable. Sixth, the willingness and ability to travel extensively in the area is probably only to be found among the local population (and foreign researchers). Seventh, focus on the topic of fertility made it imperative to have married female assistants, in order for female respondents to be put at ease when discussing issues related to pregnancy. Eighth, as the quality of education is rather low in the area, intensive training and supervision were required. However, considering the fact that the survey questionnaire was extremely long and somewhat complicated due to the range of topics included, the assistants performed wonderfully well. Ninth, time restrictions made it necessary to finish the survey under great pressure. To complete the survey successfully, good cooperation between the assistants as well as with the researcher was necessary, together with a high level of dedication from all concerned. Maintaining high spirits throughout, required that there was some pleasure to be found in the work. For the most part the contacts with the villagers and team camaraderie sought to bouy up spirits.

Ways are explored to exchange and integrate knowledge with the fields of anthropology and development administration.

This study discloses new detailed information on the dynamics of mortality, the main or perceived causes of death, and therefore, the main health hazards in the area. Fertility and its underlying mechanisms, as illustrated by Bongaart's model, are studied. Prevalent migration patterns are presented together with the factors which contribute towards these patterns. However, to investigate and understand all the background variables, more research is required in the area of perceptions, attitudes, and traditional beliefs. The current research results provides an excellent opportunity for interdisciplinary research. The application of medical, (ethno-) biological, and anthropological knowledge to the demographic data would facilitate to greater understanding. However the fact remains that the interdisciplinary character of this research remained somewhat limited and in my opinion, can be ascribed to the following causes. First, the individual researchers were not involved in or consulted on the selection of the other disciplines in the ISIR project. This research would have benefited from a fellow researcher trained in the medical or nutritional sciences. Second, and just as important, is the fact that the various research topics were not sufficiently coordinated in the initial phase of the project. The original focus of this demographic project was an in-depth study on migration, a subject, which, at that time, complemented the other research topics within the ISIR project. However, the project barely got off to ground before the focus of attention changed to a population survey incorporating the issues/aspects of fertility, marriage and marriage disruption, mortality, as well as migration. This change in focus was considered more realistic in view of the resources available to carry out the research. As a result, though demography has in principle more relevance to the other disciplines, this change in focus, together with the professional preferences of the researchers concerned with regard to the research issues, limited the scope of overlapping themes, and therefore, the interface of knowledge areas. Reviewing however, the interdisciplinary literature and incorporating the insights and findings in this book have compensated for these shortcomings, even if the literature was directly related to Irian Jaya, and in particular, the Teminabuan research area. Some exchange of information did take place on an interdisciplinary level before and after the fieldwork as this research was supervised by an interdisciplinary committee. Summarizing, the exchange of information occurred during all stages of the research, though not always to the extent initially envisaged.

7.3 Main findings

The main results of the Teminabuan survey and the literature study are summarized as follows: population structure, mortality, fertility, and migration.

1. Population structure

The age distribution of the Teminabuan population typifies high fertility, that is, heavy at the base of the population pyramid and light at the top. The percentage of the population under 15 years is 41.8 per cent (Teminabuan survey 1996), compared to 35 per cent for Indonesia (CBS *et al.*, 1995). The population figures in Teminabuan are highest in the youngest age group. Indonesia currently shows a small fertility decline as the youngest age groups are

already somewhat smaller than the consecutive ones. The percentage of population below 15 years of age in Irian Jaya is 43.1 per cent. Though higher than Teminabuan, the two youngest age groups are about the same size, indicating a recent reduction in the population growth. With regards to lower fertility rates than currently present among the population concerned, Teminabuan is, compared to Irian Jaya and Indonesia, the last to make a move in this direction.

2. Mortality

The level of mortality is closely related to the level of socio-economic development. Because of this close relation, many governments use mortality levels as indicators for planning, monitoring, and evaluation purposes, with infant and child mortality considered as the main indicators. The infant mortality rate (IMR) is 70 per 1,000 live births for Teminabuan over the years 1965-94. Under-five mortality is estimated at 120 per 1,000. For the survey population this means that of the 205 live births in 1995, 180 are expected to survive until their fifth birthday. Short birth intervals (<24 months between two consecutive live births), age of the mother at birth (>34 years), and high birth order (>3) decrease the survival chances of a child.

The mortality pattern is described in terms of age and cause of death. Death in Teminabuan is highly concentrated in the youngest age group (0-5), and it is even more than in PNG in 1980. Infectious diseases are the major killer among all age groups (62.1%), and especially infants (72.0%) and children and teenagers (72.9%). Death related to childbirth still accounts for 7.3 per cent of infant deaths. In Indonesia parasitic and infectious diseases are also major killers (Departemen Kesehatan, 1997). Most deaths are therefore caused by diseases which are preventable. Traditionally, people lived in nomadic family groups in the forests. Now they are settling in villages. With more people living closely together, good sanitation is increasingly important in the prevention of parasitic illnesses. If changes are to occur in the near future they will probably emerge in the field of mortality rather than in fertility or migration on condition that efforts and finances are directed to help prevent disease and/or improve the treatment as well as extend the accessibility of the health services. The physical characteristics of the area and the population settlement pattern however hamper this to a certain extent. Small dispersed settlements make accessible health care services extremely expensive. On top of this, the low accessibility of the area rules out the possibility of quick access to health centres further away.

Life expectancy by age, estimated on the basis of the IMR and the West Model life table of Coale and Demeny, is almost similar for Teminabuan and Indonesia. The latter is only 0.5-2 years higher. Life expectancy at birth for females is 61.8 years and for males 57.0 years in Teminabuan (Teminabuan survey 1996). According to UNICEF estimates, life expectancy at birth in PNG (1995) is a little lower (57.8 years for females; 56.1 years for males). The method of calculation used may account for the difference, but nevertheless it is surprising as health facilities have been established earlier and are more widespread in PNG compared to Irian Jaya.

3. Fertility

The number of children even born (CEB) by age of the mother provides information on the level of fertility. The number of CEB at the end of the reproductive period equals the completed fertility of an age cohort. Compared to the general Indonesian population of 1994, Teminabuan women (45-49) have on average half a child less at the end of their reproductive life (that is 4.46 children). The total fertility rate (TFR) is the average number of children that would be born per woman if all women lived to the end of their reproductive years and bore children according to the current set of age-specific fertility rates. The TFR is the most important fertility measure as it is an overall measure which is not influenced by the age structure of the population.

If fertility is more or less stable over time, the number of CEB at the end of the fertility period and the TFR should be more or less similar; it means that cohorts of older women show the same level of fertility as women who are still in their childbearing ages. This is found to be true for Teminabuan (CEB_{40-49}=4.06; TFR=3.94). Irian Jaya and Indonesia, on the other hand, show a decrease in fertility over time. The fact that Teminabuan's fertility has been stable over time can be explained by the limited and recent use of modern contraceptives with probably a high rate of method failure due to improper use. Traditional methods of contraception have a longer history and are believed to be very reliable. Also the median age at first marriage (19.00) has remained stable over time. As a downward trend was observed in the ideal family size in Teminabuan, from 4.72 children among women currently aged 45-49 to 3.11 for women aged 24-29 (see Table 5.12), the TFR could be expected to decrease in future.

Bongaarts and Potter's proximate determinants directly influence the course of the fertility process. The TFR calculated in the conventional way equals 3.94. The TFR calculated with the help of Bongaarts and Potter's model equals 2.76. The difference is considerable and may be attributed to the use-effectiveness of the contraceptive methods. In chapter 5 it is argued that the use-effectiveness of two contraceptive methods, the Pill and the traditional methods, are likely to have another value in the research area compared to Bongaarts and Potter's findings. Irregular supplies and the fact that taking the Pill is not yet daily routine for many, its effectiveness is lower than indicated by Bongaarts and Potter. Its use-effectiveness is therefore set at 0.60 instead of 0.90. The traditional methods used in the research area (plant-based contraceptives and/or bewitchment) are quite different from those on which Bongaarts and Potter based use-effectiveness (condom and rhythm). Traditional methods of contraception are regarded by the local people as quite effective. The literature fails however to mention the basis on which a reliable estimate of the use-effectiveness can be made. The use-effectiveness of traditional contraceptives is therefore set at 0.60, just a little lower than the 0.70 used by Bongaarts and Potter. These adjustments then result in a TFR of 3.34. Though not similar to the TFR calculated in the conventional way, the outcomes are of the same order of magnitude. Consequently, the proximate determinants can be considered explanatory variables of the fertility outcome. Studying the four main determinants therefore provides an opportunity to anticipate future trends of the TFR. The marriage index C_m, that is the percentage of married women of all women aged 15 to 49, has been stable over time and it is likely to remain so in the near future (C_m=0.671). In the event that all fecund women use

a hundred per cent effective method of contraception, the index of contraception would equal zero. The (adjusted) index of contraception (C_c) is 0.573. The index will never be close to zero as there is always a substantial number of non-contraceptive users among this group of women because some of them hope to become pregnant, or are currently pregnant. Some may be in a postnatal phase, or infertile (or their husband), or menopausal. However, the women who use contraceptives could make more use of more effective methods like the IUD instead of the Pill or injectables. In that case C_c is expected to decrease. Replacement of reliable traditional methods by modern contraceptives such as the Pill and injectables might however cause the index to increase (due to a high rate of method failure). The longer the period of breast-feeding and of postpartum abstinence, the more the index of postpartum infecundability will become equal to zero. Traditionally, Teminabuan women prolong breast-feeding their child (for about 24 months). It is not expected to extend beyond 24 months. Thus, the index of postpartum infecundability, C_i, will either keep its current value (0.568) or increase. An increase is to be expected when economic means become more available and baby food products become more accessible to the majority of the population. The availability of nutritious supplementary feeding will reduce the sucking impulse of the child and, consequently, advance the return of ovulation. Without effective contraceptives this will cause fertility to increase. Therefore, even now as the ideal family size reduces, the proximate determinants show that it is not likely that fertility will actually decrease in near future.

In Teminabuan most deliveries take place at home (86.8%) with the help of an (untrained) relative (73.9%). Safer delivery practices would probably increase the number of children surviving as quite a percentage of deliveries are not without increased risks, either because of the high birth order (>3; 35.9%) or the mother's age (>34; 11.8%).

4. Migration

Migration in the Teminabuan area is mainly short-distance, that is, intraprovincial. In the past, the prevailing reasons for migration were warfare, *hongi* raids, and marriage. Nowadays the most important reasons are: work (37.6%), family movement (25.5%), splitting up of settlement (13.6%), education (7.5%), and marriage (6.1%). Work is the most important reason for men to move (52.2%) whereas family movement is the most important reason for women (41.3%).

The employer is the main factor in determining the direction of work-related migration (46%). Other information channels working as 'directives' are family and friends (24%) and job-hunters (12%). The media only plays a minor role as source of information (4.1%).

Circular migration is the most common type of migration in Teminabuan subdistrict. As much as a quarter of the households (27%; n=1,400) need to move about to earn their daily living in their gardens and sago marshes. Besides, circular migration is frequent for those who sell on the market in Teminabuan town. A little over fifty per cent (51.8%) of the households mention the latter as a secondary source of income, though not all of them need to engage in circular migration. This, of course, depends on the distance of their village to Teminabuan town. Circular migration, in fact, provides a way to combine a stable food supply from subsistence agriculture with a fluctuating cash income. In this way required goods can be

bought and obligatory payments settled. Large numbers of circular migrants (and commuters) are encouraged by the cheap means of transport. In Teminabuan circular migrants go either on foot or by proa (rowing, without motor), so there are no restrictions on this type of movement. In Teminabuan subdistrict, circular migration mainly involves indigenous Papuans.

In the Teminabuan survey, migrants are defined as those 18 years and older and those who are younger but married, who have changed his or her place of residence since 1990. Within this group, 14.5 per cent (n=3,246) are identified as migrants. Compared to Pryor's typography of an Indonesian migrant, Teminabuan migrants are more evenly distributed among the sexes, that is 131 men to 100 women (instead of mainly men), and are more often married (71.1%) than single. Pryor found migrants to be mainly unskilled labourers whereas migrants to Teminabuan are generally better skilled than the population they move in to. This is a consequence of the fact that some of them are especially recruited for their higher level of education to fill vacancies in the local administration, the health services, or as teachers in secondary schools. These people mainly come from Java and Ambon. Another group of migrants, usually from Sulawesi, chose Teminabuan themselves because of business opportunities (shops; market). Similar to Pryor's findings, most migrants are young (on average 30-31 years) and belong to smaller households compared to non-migrants (3.5 and 4.6 members, respectively).

In order to analyze the demographic consequences of migration five clusters were selected as a representative sample (Chapter 2). As mentioned before, the clusters were selected on the basis of their physical features because of the assumption that the different physical characteristics influence the living conditions and thus, the demographic characteristics. Cluster I represents the eastern area around Waigo, cluster II Teminabuan town and adjacent villages, cluster III the southeastern area around Konda, cluster IV the southwestern coastal area, and cluster V the hill area. From Table 6.4 it can be seen that the distribution of the adult population over the five clusters is different for the general population compared to the migrant population. That is, the migrant population is significantly larger than the general population in cluster I (eastern area around Waigo), whereas there are significantly fewer migrants in cluster III (southeastern area around Konda) and V (hill area). The village of Waigo is currently attractive because of the adjacent trans-migration site in Aitinyo subdistrict which offers work opportunities. The population of the clusters III and V are less mobile and/or have fewer inmigrants compared to the general population.

Relatively few households with an unmarried child living permanently elsewhere are found in cluster III, whereas a relatively large number is found in cluster V. Cluster V is the hill area, the most isolated area of the subdistrict, where commuting or circular migration is not an option. Though speculative, the population of cluster III has a seafaring tradition which involves the whole family. Continuation and completion of primary education is therefore a complicated matter. Continuation to secondary level in Teminabuan town or elsewhere is therefore often out of the question.

The percentage of the adult population that moved since 1990 is highest in cluster I (28.5%; n=298). When analyzing this at age group level (cf. Table 6.6), the age groups of 10-14, 25-29, and 30-34, significantly differ from the total population, in the sense that in cluster I the age group 10-14 is under-represented and the age groups 25-29 and 30-34 are over-represented. As the highest percentage of those who move is found in cluster I, it was also likely that the biggest 'disturbances' in the age distribution would occur within this cluster.

The population distribution by sex is not much influenced by migration (to and within the subdistrict) as the most dominant type of migration is circular migration in which about 95 per cent (n=368; cf. Sub-section 3.4.3) of both parents (and others) are involved. Moreover, these people do not move permanently and stay within the administrative borders of the Teminabuan subdistrict. Outmigration of unmarried children is however quite male-dominated; some 69.6 per cent (n=322) of them are male. The effect is present and especially clear for the age group 20-24 (cf. the population pyramid in Sub-section 3.5.2). This age group is smaller than the age group 25-29, and also is it smaller than the age group 20-24 for females. Also the age group 30-34 is smaller for men than for women. Though, the fact that their number is fairly limited and part of them return (after completing education/work), reduces the effect. Increased (secondary and higher) school attendance in future may however strengthen its effect on the population composition. The overall sex distribution of the general population is about even, while the distribution of the 'migrant' population is slightly in the favour of males. Especially the sex distribution of the migrants of cluster I, where work-related migration is prevalent, is very much dominated by males.

Demographic change

Fertility appears to be stable over time and no major changes are expected in the near future. Work-related in- and outmigration does influence the population composition, though to a limited extent. Because in- and outmigrants are of about the same age, this diminishes their effect on the population composition. Besides, their number is limited, which again restricts its effect on the population composition. If anything, it may have enlarged the age group 25-39 somewhat. Slight dips in the age groups 15-19 (females) and 20-24 (males) are likely the result of (temporary) migration for educational purposes. Only if secondary and higher school attendance rates would increase in future, these dips would become more significant. This is however not yet anticipated. Together with the mortality pattern, that is, relatively many deaths at young ages, the population pyramid is likely to keep its current shape which is in general: broad at the base and narrow at the top. When mortality decreases, for instance because of a declining mortality due to infectious and parasitic diseases, the population pyramid will be affected in such a way that the size of the age groups will comparatively slowly decrease with increasing age.

To see whether demographic transition has already started in Irian Jaya, and in particular in Teminabuan subdistrict, we have to consider the pattern of fertility and mortality over time. According to the transition model, both fertility and mortality are high and fluctuating before transition sets in. Transition starts with declining mortality after which fertility follows, only less rapidly. From the chapter on mortality we know that mortality is on the decline - infant, child, as well as adult mortality (survey statistics on Teminabuan are not always sufficient to

support this, in which case we refer to Indonesian data). Also epidemics are not so frequent and widespread any more. With regard to fertility, there is little proof of a lower fertility rate yet, reflected by the number of CEB at the end of the fertility period which is very similar to the (current) TFR. We therefore may conclude that Teminabuan is in the very early stages of demographic transition.

The main findings in summary are:

Socio-economic setting

- There is hardly any infrastructure in Teminabuan subdistrict. Roads, telephone communication, reasonable first aid, and shops are restricted to Teminabuan town (no. of inhabitants is 3,117 [1996 Teminabuan survey]).
- The formal sector is very small and comprises the local administration, primary and secondary schools, a few health posts, and a number of shops which are all, except for primary schools, very much concentrated in Teminabuan town.
- In the past and even today (1996), Teminabuan subdistrict is an isolated area. Till 1996 Teminabuan has not been selected as a transmigration settlement area. There are migrants in the area, but their number is limited and fairly stable. They mainly work in the local administration, the health sector, at secondary schools, and as traders. Before, oil exploitation in the Sorong region provided short-term contract work, but this was significantly reduced when the oil-business collapsed in the 1980s.
- Numerous differences between the immigrant population (Muslim; educated; economically active) and the indigenous population (Protestant; low-educated; economically almost non-active) make the society vulnerable to social unrest as has been witnessed on Ambon and Kalimantan (1999) (cf. Mboi, 1997).

Mortality

- Life expectancy is for the research population somewhat similar to that of Indonesia as a whole. For the latter it is about 1-2 years more. High infant and child mortality is common to both. Actually, Teminabuan's mortality by age and sex is very similar to that of Indonesia, although the level for Indonesia as a whole is a little lower. The more developed areas of Indonesia such as urban Java and Bali definitely show different mortality levels but these figures are balanced by areas such as Kalimantan, Nusa Tenggara, and East Timor.
- Infectious diseases are by far the major killer, especially among infants, children, and youngsters.

Fertility

- Fertility is relatively moderate for a non (modern) contraceptive using area. This (partly) results from traditional practices to space births with a sufficient time interval, so usually mothers do not have to cope with two infants an the same time.
- Fertility has been stable over time at a moderate level.

Migration

- The population is highly mobile as a result of subsistence agriculture and fishing activities.

- A consequence of the high rate of circulation in the research area is that the time people spend in the villages is limited. As a result from this way of living, education and health services are not within reach of everyone. This is due to either the absence of the provider of these services (teacher; health worker) and/or the receiver (villager).

The major finding of this study is the fact that demographic transition has only just started in Teminabuan subdistrict. Whether this will lead to a trend in future remains to be seen.

Acronyms, definitions and glossary

Age standarization	A procedure of adjustment of crude rates (e.g. CBR) designed to reduce the effect of differences in age structure when comparingrates for different populations
ASFR	Age-specific fertility rate: The number of births occuring during a twelve-months period of women of a certain age group, divided by the mid-period population of women of that age.
Balita	*Balai Lima Tahun* (under-five age group)
BKIA	*Balai Kesehatan Ibu dan Anak* (Women and Child Health Centre)
BPS	*Biro Pusat Statistik* (Central Bureau of Statistics)
Child mortality	The probability of dying between exact age one and exact age fivefor a newborn child.
CBR	Crude Birth Rate: the CBR is usually calculated as the number ofbirths occuring in a twelve-month period, divided by the mid-period population CBS Central Bureau of Statistics
CDR	Crude death rate. Number of deaths in a population during a specified period divided by the number of person-years lived bythe population during the same period. It is frequently expressed as deaths per 1,000 population. The CDR for a single year is sually calculated as the number of deaths during the year divided y the mid-year population.
CWR	Child-Woman Ratio: usually calculated as the number of children aged 0-4 at a certain point in time, divided by the female population aged 15-49.
De facto population	Population enumerated on the basis of those present at a particulartime, including temporary visitors and excluding residents temporarily absent.
De jure population	Population enumerated on the basis of usual residence, excludingtemporary visitors and including residents temporarily absent.
Departemen Kesehatan	Ministry of Health
DHS	Demographic and Health Survey
Fecund	A women is considered fecund if she is capable of bearing liveoffspring.
Fecundability	The probability of conceiving in a month among fecundable women.
Fecundity	Ability to reproduce
Fertility	Actual reproduction Fetal death All deaths where no live birth has taken place. It embraces therefore events such as stillbirths, miscarriages, and abortions. WHO recommends to group all events, stillbirths, miscarriages, abortions, under the heading 'fetal death' and to classify them as early, intermediate, and late, according to the months of gestation. < 20 weeks of gestation: early fetal death;

	20-27 weeks of gestation: intermediate fetal death; >= 28 weeks of gestation: late fetal death (Shryock and Siegel, 1976, pp. 221-222). Fetal deaths occurring before 28 weeks of gestations is also called abortion, which can be either spontaneous or induced. Fetal death occurring at 28 weeks of gestation or more are also called still-births.
GFR	General Fertility Rate: usually calculated as the number of births divided by the number of women of childbearing age at mid-year.
IDHS	Indonesian Demographic and Health Survey
Infant mortality	The probability of dying between birth and exact age one year.
Infecundity	Biological infertility
Infertility	Childlessness
IRD	Institute for Resource Development
ISIR	Irian Jaya Studies, a programme for Interdisciplinary Research.
IUD	Intra Uterine Device
Kabupaten	District
Kader posyandu	Trained assistants for the lowest level of health services. Theyusually assist other health personel with the monthly checkup of small children.
Kecamatan	Subdistrict
Kepala desa	Head of a village
Live birth	A live birth is the complete expulsion or extraction from its motherof a product of conception, irrespective of the duration ofpregnancy, which after such separation breathes or shows anyother evidence of life such as beating of the hearth, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached. Each product of such a birth is considered live-bornregardless of gestational age (Demographic Yearbook, 1994, NewYork: United Nations).
MMR	Maternal mortality rate, which is more or less defined as the risk of dying as a result of 'complications of pregnancy, childbirth, and the puerperium' (Shryock and Siegel, 1976, p. 241). A maternal death is defined by the International Classification of Diseases (ICD 9 and 10) as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes (WHO, Maternal Mortality: A Global Factbook, 1991, p. 17).
MoH	Ministry of Health
Moving averages	The successive averaging of two or more adjacent values of a series in order to remove sharp fluctuations.

Neonatal mortality	The probability for a newborn of dying within the first month of life.
NFPCB	National Family Planning Coordination Board
Outer Java-Bali II region	Includes the most eastern provinces: Riau, Jambi, Bengkulu, EastNusa Tenggara, East Timor, Central Kalimantan, East Kalimantan, Central Sulawesi, Southeast Sulawesi, Maluku, and Irian Jaya.
Own-children method	A refinement of the 'reverse-survival' procedure for fertility estimation, whereby estimates of 'age-specific fertility rates' for the recent past are obtained by relating mothers to their own children, using information on relationship and other characteristics available from a census or survey.
PKMD	*Pembangunan Kesehatan Masyarakat Desa* (Village Community Health Development Programme)
PNG	Papua New Guinea
Postneonatal mortality	The probability for a newborn of dying after the first month of life but before exact age one year.
Posyandu	Pos Pelayanan Terpadu (integrated health centre)
P3W	*Pusat Pengembangan dan Pembinaan Wanita* (women's training centre)
Puskesmas	*Pusat Kesehatan Masyarakat* (Community Health Centre)
Puskesmas pembantu	Subhealth centre
Repelita	*Rencana Pembangunan Lima Tahun* (five-year development plan)
Retrospective survey	Survey that obtains information about demographic events that occured in a given past period, generally terminating at the time of the survey.
Sex ratio at birth	Number of male births per 100 female births.
SMA	*Sekolah Menengah Atas* (Senior High School)
SMP	*Sekolah Menengah Pertama* (Junior High School)
Still-birth	Also called late fetal death. Foetus born dead after a period of gestation of 28 weeks or more (Shryock and Siegel, 1976, p. 245).
TBA	Traditional Birth Attendant
TFR	Total Fertility Rate: the average number of children that would be born per woman if all women lived to the end of their childbearing years and bore children according to a given set of 'age-specific fertility rates': also referred to as total fertility.
UN	United Nations
Under-five mortality	The probability of dying between birth and exact age five.
UNICEF	United Nations Children's Fund
UNFPA	United Nations Family Planning Association
UPGK	*Usaha Perbaikan Gizi Keluarga* (Family Nutrition Improvement Programme)
WFS	World Fertility Survey
WHO	World Health Organization

Appendix 2.1

Event chart

PERISTIWA KHUSUS UNTUK BISA KIRAKAN UMUR

(special events to date age)

5-2-1855	Injil masuk Irian Jaya (Christian faith was introduced in Irian Jaya)
1914-1918	Perang dunia pertama (First World War)
27-1-1927	Injil masuk di Teminabuan/Tehit (Christian faith was introduced in Teminabuan/Tehit region)
1927	Pembunuhan komdan KNIL, [polisi lanskap] di Eles (KNIL commander murdered near the village of Eles)
1942	Perang Japan/Nipon (Japanese War)
1940-1945	Perang dunia kedua (Second World War)
1950	Kantor Distrik pindah dari Konda ke Tehit/Teminabuan (Movement of district administration from Konda to Teminabuan)
1953	Pembakaran kain timur oleh Kerajaan Belanda bersama dengan Zending dan masyarakat (Burning of *kain timur* [imported cloths, used for ceremonial exchange] by the Dutch rule together with the missionaries and the local population)
1954	HPB (*Hoofd Plaatselijk Bestuur*) pindah dari Inanwatan ke Teminabuan (Movement of head of the Dutch administration from Inanwatan to Teminabuan)
26-10-1956	GKI berdiri sendiri (Establishment of the Protestant church)
1960	Nieuw-Guinea Raad (parlemen) dibentuk (Constitution of the West New Guinea parliament)
1962	Orang Belanda pulang (Dutch people leave Irian Jaya)Trikora (*tri komando rakyat*)/
	Turun payung di Wersar (Dropping of paratroops at Wersar)
1963	Indonesia masuk Irian Jaya (Indonesia starts ruling Irian Jaya)
1967	Operasi tumpas OPM oleh tentara Republik Indonesia (Operasi Papua Merdeka, free Papua movement, destroyed by Indonesian soldiers)
1969	Pepera: ditandatangi perjanjian di Jakarta oleh pewakil di Irian Jaya (signing of agreement in Jakarta by representatives of Irian Jaya to accept Indonesian rule)
1972	Pemilu pertama (First national elections)
1972	Epidemi muntaber/kolera di daerah Teminabuan (Cholera epidemic in Teminabuan region)
1977	Pemilu kedua (Second national elections)
1982	Tahun yang panas (Very warm year)
1982	Pemilu ketiga (Third national elections)
1987	Pemilu keempat (Fourth national elections)

1990	Sensus Penduduk (Population census)
April 1992	Pemilu yang terakhir (Last national elections [in 1996])

khususnya mengenai desa Waigo

1917	Injil masuk Waigo (Christian faith was introduced in the village of Waigo)
1958	Pembuatan jembatan besi oleh orang Belanda (Construction of iron bridge by the Dutch)
1960	Pindah dari tempat lama ke tempat ini (Movement of village from former location to current one)
1969	Sekolah Dasar mulai di Waigo (Foundation of primary school in the village of Waigo)
1981	Waigo jadi desa (Waigo receives the status of *desa*)
1991	Membuat jembatan besi baru (Construction of new iron bridge)

khususnya mengenai desa Sungguer

1962/1963	Pembangunan kampung Sungguer (Establishment of Sungguer hamlet)
1991	Sungguer jadi desa (Sungguer receives the status of *desa*)
	Injil masuk Sungguer (Christian faith was introduced in the village of Sungguer)

khususnya mengenai desa Haha

1947	Pembangunan kampung Haha (Establishment of Haha hamlet)
1964	Sekolah Dasar mulai (Foundation of primary school in the village of Haha)
1975	Haha jadi desa (termasuk Woloin dan Tofot) (Haha receives the status of *desa*, which includes the hamlets of Woloin and Tofot as well)
1992	Desa Haha berdiri sendiri (Haha becomes and independent *desa*)

khususnya mengenai desa Mlaswat

1968	Pembangunan kampung Mlaswat (Establishment of Mlaswat hamlet)
	Sekolah Dasar mulai (Foundation of primary school in the village of Mlaswat)
1992	Mlaswat jadi desa (Mlaswat receives the status of *desa*)

khususnya mengenai desa Manggroholo

1930	Pembangunan kampung Manggroholo (Establishment of Manggroholo hamlet)
1940-42	Injil masuk di Manggroholo (Christian faith was introduced in the village of Manggroholo)
1951	Pembangunan kampung Manggroholo (Establishment of Manggroholo hamlet)
1962	Sekolah Dasar mulai (Foundation of primary school in the village of Manggroholo)
1970	Manggroholo jadi desa (Manggroholo receives the status of *desa*)

khususnya mengenai desa Sayal

1948	Pembangunan kampung Sayal (Establishment of Sayal hamlet)
1975	Sayal jadi desa (Sayal receives the status of *desa*)

Appendix 2.2

PERCEPTION OF SPECIAL EVENTS IN LIFE

	Too early	Just right	Too late
First menstruation	<-- 11 yr	12 - 14	15 -->
Age at marriage F	<-- 16 yr	17 - 24	25 -->
Age at marriage M	<-- 18 yr	19 - 26	27 -->
Age at first delivery	<-- 24 yr	25	26 -->

Source: Survey team, 1996.

Appendix 2.3a

PLANNED SCHEDULE OF THE DEMOGRAPHIC SURVEY IN TEMINABUAN SUBDISTRICT

May	6 - 11	: Welek
	11 - 18	: Pasir Putih
	18/19 - 22	: Kofalit (if required, spent the night in Mlabolo)
	22 - 28	: Sasnek
June	28 - 1	: Sawiat
	1 - 7	: Eles
	7	: return to Teminabuan town
	8 - 13	: break/printing questionnaires
	14 - 20	: Waigo
	20 - 25	: Sungguer
	25	: return to Teminabuan town
	26 - 28	: rest
July	29 - 3	: Bariat/Menelek
	3 - 11	: Konda/Wamargege
	11	: return to Teminabuan town
	12 - 18	: break/printing questionnaires
	19 - 24	: Haha
	24 - 30	: Mlaswat
August	30 - 7	: Kwowok/Manggroholo
	7 - 12	: Sayal
	12	: return to Teminabuan town
	13 - 18	: rest/printing questionnaires
	19 + 20	: Seribau
	21 - 28	: Wermit
	29	: break
September	30 - 8	: Kaibus
	9 + 10	: break
	11 - 22	: Kohoin

Appendix 2.3b

ACTUAL SCHEDULE OF THE DEMOGRAPHIC SURVEY IN TEMINABUAN SUBDISTRICT

May	11 - 15	: Welek
	15 - 21	: Pasir Putih
	21 - 24	: Kofalit
	24 - 30	: Sasnek
June	30 - 4	: Sawiat
	4 - 7	: Eles
	7	: return to Teminabuan town
	8 - 13	: break/printing questionnaires
	14 - 20	: Waigo
	20 - 22	: Sungguer
	22	: return to Teminabuan town
	26 - 28	: rest
July	29 - 4	: Bariat/Menelek
	4 - 9	: Konda/Wamargege
	9	: return to Teminabuan town
	12 - 17	: break/printing questionnaires
	18 - 21	: Haha
	21 - 23	: Mlaswat
	23 - 28	: Kwowok/Manggroholo
	29 - 31	: Sayal
	31	: return to Teminabuan town
August	1 - 5	: break/printing questionnaires
	6 - 9	: Seribau
	13 - 21	: Wermit
	22 - 31	: Kaibus
September	2 - 7	: Kohoin

Appendix 2.4

Definition of household in the case of Teminabuan subdistrict

Based on information gathered during the feasibility study, the definition of household applicable to the Teminabuan research area is as follows: a household (consisting of one or more persons) shares its living and eating arrangements and forms an economic unit. Besides forming an economic unit, a household also shares the care of its young and old members. With this definition, the individual households could clearly be identified during the survey, as it was also a definition is understood by the local people. In Teminabuan, living arrangements of more than one household in a single house are very common.

Various definitions of households can be found in the literature, some of which correspond more or less to the situation found in the research area. For comparison, other definitions of a household are presented here.

Our definiton corresponds with Hüsken (1988, p. 115), who adopted the definition from an UNO Manual on Methods of Estimating Population VII (1973), which reads: 'The concept of 'household' is based on the arrangements made by persons, individually or in groups, for providing themselves with food or other essentials for living. A household may be either: (a) a one-person household, that is, a person who makes provision for his own food or other essentials for living without combining with any other person to form a multi-person household; (b) a multi-person household, that is, a group of two or more persons who make common provision for food and other essentials for living. The persons in the group may pool their incomes and have a common budget to a greater or lesser extent; they may be related or unrelated persons, or a combination of both.'

This definition overlaps for a greater part with two other definitions cited by Hüsken (1988, p. 115), which were especially formulated for Java, to wit:
1) 'The household (*somah*) as the primary unit of consumption, production, child rearing, ritual performance, and social activity' (quoting Koentjaraningrat, 1960);
2) 'The household as the group of people who cook and eat together, signifying a general though not necessarily total pooling of day-to-day resources, work opportunities and social obligations even though the individuals concerned may retain separate control of landholdings and other forms of wealth' (quoting White, 1976).

According to Hüsken (1988, p. 115), the most simple and in most cases useful definition of a Javanese household is 'a group of people eating from one kitchen and living in one house', which he quotes from Pandam Guritno (1958). However, this is too rigid a classification with regard to Irian Jaya, because of the multiple living arrangements found in one household and the number of fireplaces.

Jay (1969) identifies the nuclear family as the basic unit of economic and social independence and social recognition. The most specific term used for the social unit that displays this behaviour is *somahan*, the term used officially in village complex census records, which Jay

(1969, p. 53) called 'hearthold'. A hearthold is the unit liable for village and village complex taxation, that is, for the various labour duties a villager must perform when called on. This depends upon the size of his landholdings. It is the unit for most exchanges of food gifts, labour, and invitations to family celebrations and to share-cropping agreements. It is the unit that entitles its members to social representation in their village. The hearthold is identified with the concept of the nuclear family as an independent economic unit, a concept that appears to be applicable in Java. A hearthold's standing entitles the head, that is, either spouse or both acting jointly, to handle its resources more or less independently, to contract economic obligations on their own, to be treated as a separate social unit by kinsmen, neighbours, and the corporate village community in food exchanges, private and communal ceremonies, and work parties, and to become eligible for corporate village land. A hearthold's standing is achieved when a couple can demonstrate their ability to feed themselves, and it is customarily marked by their use of a separate cooking hearth and a separate larder, especially a separate store of rice. Until this condition is attained, a couple live as dependents of another couple, most often the parents of one of them. In the eyes of their community they remain minors (Jay, 1969, pp. 86-87).

Niehof (1985, pp. 147-148) reviewed various authors who used the concept 'household', and found three cornerstones of the institutional complex of household and family, to wit: kinship, residence, and domestic activities. Niehof (1985) quotes Goody (1974) who underlined the ambiguous character of the concept of household because 'it carries both the meaning of consumption unit as well as a dwelling group'. Bender (1967), also quoted by Niehof (1985) tried to redefine the household concept by examining the two pillars of the household: co-residence and domestic functions. Co-residence 'refers to living together, which is minimally characterized by a proximity of sleeping arrangements and a sentiment similar to that expressed in our folk-concept of home'. Domestic activities are those 'concerned with the day-to-day necessities of living, including the preparation of food and the care of children.'

Holmberg (1987, p. 328) defines a household as a group of people who live in the same dwelling, or in the same house. A family, on the other hand, is generally defined as a group of relatives sharing the same dwelling. The definition of a household used in the population censuses of Sweden is based on the concept of individuals sharing the same dwelling unit.

Though many authors share more or less the same idea of household definition, most authors, especially authors focusing on households in Western countries, usually do not incorporate the possibility that several households can share the same house.

Appendix 2.5

Population data by cluster: the total number of inhabitants and number of heads of households are given in brackets (data derived from *Kantor Camat* Teminabuan, October 1995)

Cluster I: Waigo (495; 117)+ Sungguer (267; 63) + Keyen (376; 80)

Cluster II: Kaibus (1618; 258) + Kohoin (1436; 272) + Wermit (518; 110) + Aibobor (409; 97)

Cluster III: Konda (359; 97) + Wamargege (432; 88) + Bariat (170; 36) + Menelek (312; 60)

Cluster IV: Haha (262; 45) + Woloin (198; 45) + Tofot (152; 37) + Sayal (340; 42) + Komanggaret (168; 35) + Sisir (302; 59) + Manggroholo (439; 61) + Mlaswat (222; 47) + Seribau (572; 125)

Cluster V: Wehali (324; 72) + Welek (278; 57) + Pasir Putih (388; 92) + Klamit (140; 35) + Mlabolo (137; 30) + Kofalit (187; 33) + Wenslolo (370; 42) + Sasnek (356; 71) + Sawiat (517; 80) + Eles (231; 61)

The overall mean of the number of members per household is 5.0.

Appendix 2.6

Table 2.3 **Facilities found in all villages in Teminabuan subdistrict**

Village	School	Health facility	Near road
Kaibus/Kohoin/Wermil/Aibobor	+	+	+
Wersar	+	+	+
Menelek/Bariat	+	+	-
Konda/Wamargege	+	+	-
Waigo	+	+	+
Sungguer	+	+	+
Keyen	+	+	+
Seribau	+	+	+
Tofot	-	+	+
Haha	+	+	+
Woloin	+	-	-
Sisir	+	-	-
Komanggaret	+	-	-
Mlaswat	+	-	-
Kwowok (dusun of Manggroholo)	-	-	-
Wehali	+	-	-
Eles	+	+	-
Sawiat	+	+	-
Sasnek	+	+	-
Wenslolo	+	-	-
Kofalit	-	-	+
Mlabolo	-	-	+
Klamit	-	-	+
Pasir Putih	+	+	+
Welek	+	-	-
Sayal	+	+	-
Manggroholo	+	+	-
Total	-=5/+=22	-=11/+=16	-=15/+=12

Source: Feasibility study Teminabuan subdistrict, 1996.

Note:

1. + denotes the presence of a facility; - denotes the absence of a facility.
2. Some villages are clustered together as they are located very close to each other, which means that neighbouring populations can enjoy the use of the facilities available.
3. Villages in italics are included in the survey. It should be remarked however that villages with a health facility differed in the availability of health services. In a few villages, the new building stood ready, though without personnel. In the villages of Sasnek and Haha, the presence of a health facility only meant once a month consultations for babies, small children and pregnant women.

At the time of our visit, bulldozers had just cleared tracks leading to some villages. Considering the tropical weather and elevation of some parts of the road, only four-wheel drive vehicles are suitable for such terrain.

Appendix 2.7

SURVAI DAERAH TEMINABUAN
1996
(SURVEY TEMINABUAN 1996)
INTRODUKSI
(INTRODUCTION)

* Nomor gugusan (no. cluster):
* Nomor desa (no. village):
* Nomor rumah tangga (no. household):

* Nama desa (name village):
* Nama kepala rumah tangga (nama fam dan nama kecil) (name head of household (family name and christian name):
* Nomor cat di rumah tangga (no. idicated on house):

* Nama petugas (interviewer's name):
* Tanggal wawancara (date of interview):
* Bahasa selama wawancara (language used during interview):
  1. Bahasa Indonesia; 2. Bahasa dearah (local language)

DAFTAR PERTANYAAN (KUESIONER) RUMAH TANGGA UMUM
(GENERAL HOUSEHOLD QUESTIONNAIRE)

**********DULU,BILANG
DEFINISI "RUMAH TANGGA" YANG KITA PAKAI DALAM INTERVIU : **RUMAH TANGGA ADALAH SEMUA ORANG YANG BIASANYA MAKAN DAN BERMALAM DI SATU RUMAH DAN PUNYA HUBUNGAN DENGAN SATU KEPALA KELUARGA TERTENTU.** (FIRST TELL THE DEFITION OF "HOUSEHOLD" WHICH IS USED DURING THE INTERVIEW- A HOUSEHOLD ARE ALL PEOPLE WHO USUALLY LIVE AND EAT IN ONE HOUSE AND ARE RELATED TO ONE PARTICULAR HEAD OF HOUSEHOLD.
****

KETERANGAN RUMAH TANGGA (HOUSEHOLD INFORMATION)

P.1 Berapa rumah tangga ada di dalam rumah ini? Jumlah (no.):
(What is the number of households in this building)

P. 2 Rumah ini punya berapa kamar?
(How many rooms are there in this house) Jumlah (no.):_

P.3 Rumah ini rumah panggung? (Is this a house on piles) <Ya/Tidak>

P.4 Bapak/Ibu pakai atap terbanyak apa? (What is the main construction material of the roof)
1. Beton (concrete)
2. Kayu/sirap (wood)
3. Asbes (asbestos)
4. Seng (corrugated iron/zinc)

5. Gaba-gaba (vein of sagopalmleaf)
6. Daun-daunan (leaves)
7. Lainnya, tentukan (other, to wit;):_____

P.5 Bapak/Ibu pakai dinding luar terbanyak apa? (What is the main construction material of the outer walls)
1. Semen/mesel dengan gaba-gaba (concrete with gaba-gaba)
2. Batu bata (bricks)
3. Kayu (wood)
4. Bambu (bamboo)
5. Gaba-gaba (vein of sagopalmleaf)
6. Gagar (laths)
7. Lainnya, tentukan (other, to wit):_____

P.6 Bapak/Ibu pakai lantai terbanyak apa? (What is the main construction material of the floor)
1. Semen (concrete)
2. Bata merah (bricks)
3. Ubin/tegel/teraso (tiles)
4. Kayu (wood)
5. Bambu (bamboo)
6. Gagar (laths)
7. Tanah (earth)
8. Lainnya, tentukan (other, to wit):_____

P.7 Bapak/ibu biasanya pakai bahan yang mana untuk masak di rumah tangga ini? (What cooking facilities does this household generally use)
1. Kayu bakar (fire-wood)
2. Arang (charcoal)
3. Minyak tanah (kerosene)
4. Gas (gas)
5. Lain, tentukan (other, to wit):_____

P.8 Bapak/Ibu pakai lampu yang mana? (satu atau lebih jawaban bisa) (Which type of lighting do you use)
1. Listrik (electricity)
2. Petromaks (high-pressure lamp)
3. Pelita/ minyak tanah (oil-lamp)
4. Lilin (candle)
5. Lainnya, tentukan (other, to wit):_____

P.9 Bapak/Ibu ambil air minum dari mana? (satu atau lebih jawaban bisa)(source of drinking water)
1. Air pipa/air kran/air ledeng (pipe water)
2. Mata air/pancuran (spring: watersource from stone or rock)
3. Air perigi/ air sumur (well: watersource from earth)
4. Air pompa (pump)
5. Sungai/kali (river)
6. Air hujan (rainwater)
7. Lainnya (other), tentukan (specify):_____

P.10 Air itu, Ibu/Bapak minum mentah? <Selalu/Kadang-kadang/Tidak Pernah>
(Do you dring this water untreated? <always/sometimes/never>)

P.11 (Kalau kadang-kadang/tidak pernah :) Bagaimana dibersihkan. (If sometimes or never, how do you clean the water)
1. Rebus/masak (boil)
2. Pakai filter (filter)
3. Lain, yaitu (other, to wit):_____

P.12 Untuk mandi dan cuci, Ibu/Bapak pakai air apa? (satu atau lebih jawaban bisa) (What is your source of water for washing and bathing)
1. Air pipa/air kran/air ledeng (pipe water)
2. Mata air/air pencuran (spring: watersource from stone or rock)
3. Air perigi/ air sumur (well: watersource from earth)
4. Air pompa (pump)
5. Sungai/kali (river)
6. Air hujan (rainwater)
7. Lainnya (other), tentukan (specify):_____

P.13 Untuk berak (buang air besar), Bapak/Ibu/anak punya tempat yang mana? (Where do you go to relieve yourself)
1. Wese (W.C)/kakus pribadi (private toilet)
2. Wese umum (shared toilet)
3. Kebelakang (anywhere outside)
4. Di kali (outside in river)
5. Lainnya (other), tentukan (specify):_____

P.14 Bapak/Ibu punya kebun/berkebun? <Ya/Tidak>
(Do you have a vegetable garden)
(Kalau ya) Kebun Bapak/Ibu punya, berapa jauh dari sini? (If yes, at what distance is it located from here)
Waktu perjalanan pergi (traveling time):_____jam (hrs)
Ibu/Bapak naik perahu (1) atau jalan kaki (2)?_____
(Do you go by boat (1) or on foot (2))

P.15 Bapak/Ibu punya dusun/menokok sago? <Ya/Tidak>
(Do you have a sagofield)
(Kalau ya) Dusun Bapak/Ibu punya, berapa jauh dari sini? (If yes, at what distance is it located from here)
Waktu perjalanan pergi (traveling time):_____jam (hrs)
Ibu/Bapak naik perahu (1) atau jalan kaki (2):_____
(Do you go by boat (1) of on foot (2))

P.16 Bapak/Ibu punyai perahu? <Ya/Tidak>
(Does the household have any boats)

P.17 Kalau ya, berapa perahu semang dan kajang; dan berapa perahu jonson? (If yes, how many without and how many with motor)
Jumlah perahu semang dan kajang (no. of boats without a motor):_____

Jumlah perahu jonson? (no. of boats with a motor):_____

P.18 Apakah Bapak/Ibu punya ternak? <Ya/Tidak>
(Does the household have any cattle)

P.19 (kalau ternak ada) Jenis binatang apa yang Bapak/Ibu piara sekarang, dan berapa ekor Ibu/Bapak punya?
(If yes, what kind and how many of each do you keep)

ternak (cattle)	jumlah ekor (number)
1. babi (pig)	_____
2. ayam (chicken)	_____
3. kambing (goat)	_____
4. sapi (cow)	_____
5. kolam ikan (fish-pond)	_____
6. lain, yaitu (other, to wit):_____	_____

P.20 Sekarang saya mau tanya sedikit tentang barang-barang rumah tangga punya. (Do you have any of the following in this household)

- Bapak/Ibu punya radio/kaset/tape? (radio/cassette/tape) <Ya/Tidak>
- Bapak/Ibu punya petromaks? (high-pressure lamp) <Ya/Tidak>
- Bapak/Ibu punya komfor? (brazier) <Ya/Tidak>
- Bapak/Ibu punya televisi? (television) <Ya/Tidak>
- Bapak/Ibu punya khommo/tempat tidur? (bed) <Ya/Tidak>
- Bapak/Ibu punya lemari?(cupboard) <Ya/Tidak>
- Bapak/Ibu punya meja dan kursi?(table and chairs) <Ya/Tidak>
- Bapak/Ibu punya kasur? (mattresses) <Ya/Tidak>

P.21 Bapak/Ibu beragama apa? (What is your religion)
1. Protestan/Kristen lain (Protestant/overige Cristenen)
2. Katholik (Catholic)
3. Baptis (Baptist)
4. Islam (Moslem)
5. Lainnya, tentukan (Other, to wit):_____

P.22 Bahasa apa yang dipakai sehari-hari di dalam rumah ini? (satu atau lebih jawaban boleh)
(What is the daily language used by the household members when they are at home)
1. Bahasa Indonesia (Indonesian)
2. Bahasa dearah (local language), tentukan (to wit):_____
3. Bahasa lain (other language):_____

KEGIATAN EKONOMI (ECONOMIC ACTIVITIES)

P.23 Mata pencaharian **pokok** rumah tangga ini adalah apa? (What is the main source of income of this household)
1. Berkebun (growing crops)
2. Menokok sagu (beating sago)
3. Cari ikan (fishing)
4. Berburu (hunting)
5. Pegawai (guru sekolah, pendeta, pemerintah) (civil servant)
6. Pedagang (trader)

7. Pemilik/punya toko/warung (shop owners/personnel)
8. Menjual hasil kebun/dusun di pasar (selling of crops)
9. Pensiun (pension)
10. Lain, yaitu (other, to wit):_____

P.24 Apakah rumah tangga ini punya mata pencaharian lain lagi? (satu atau lebih jawaban boleh) (Are there any other sources of income in this household, more than one answer is allowed)
1. Berkebun (growing crops)
2. Menokok sagu (beating sago)
3. Cari ikan (fishing)
4. Berburu (hunting)
5. Pegawai (guru sekolah, pendeta, pemerintah) (civil servant)
6. Pedagang (trader)
7. Pemilik/punya toko/warung (shop owners/personnel)
8. Menjual hasil kebun/dusun di pasar (selling of crops)
9. Pensiun (pension)
10. Lain, yaitu (other, to wit):_____

P.25 Untuk cari nafkah, Bapak/Ibu pulang-pergi setiap hari?
(To provide the household income/sources, do go and come back every day to this house) <Ya/Tidak>

P.26 (kalau tidak pulang setiap hari) Berapa kali seminggu/sebulan Bapak/Ibu pulang? (If not returning home every night, how often do you come home per week/per month)
1. Setiap 2, 3 hari (every few days)
2. Setiap minggu/setiap hari Sabtu (once every week/on saturdays)
3. Setiap bulan sekali (once every month)
4. Waktu libur sekolah (school-holidays)
5. Lain, tentukan (other, to wit):_____

P.27 (kalau tidak pulang setiap hari) Siapa pergi keluar? (If not returning home every night, who is staying outside)
1. Bapak (man)
2. Ibu (woman)
3. Bapak dan Ibu (man and woman)
4. Bapak dan Ibu dan semua anak-anak (+ orang lain) (man, wife, and all children (and other persons))
5. Bapak, Ibu, dan anak-anak yang tidak harus pergi ke sekolah (yang berumur sampai 6 tahun dan yang berumur 16 tahun ke atas) (man, wife, and non-schoolgoing children: under 6 and over 16 years of age)

P.28 Bapak/Ibu bisa mendaftar semua orang yang biasanya tinggal dan makan di rumah tangga ini: dewasa, anak-anak dan bayi-bayi? (Can you list all the people who usually eat and sleep in this household: adults, children, as well as babies)

KOMPOSISI RUMAH TANGGA (HOUSEHOLD COMPOSITION)

Name	Relation to head of house hold	Sex	Date of birth	Age	Marital status	Daily activity	Highest grade attended	Highest level of education	Able to speak B.I.	Able read and write	Remarks
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											

P.29 Apakah ada bayi atau anak kecil yang belum dicatat?

(Are there any other persons such as children or infants that have not been listed)

- Ya, tulis nama dalam daftar (yes, write the name(s) on the list)
- Tidak (no)

P.30 Apakah ada orang lain yang mungkin bukan keluarga seperti pembantu rumah tangga, orang yang menumpang, atau teman bukan anggota keluarga, tetapi biasa tinggal di rumah ini?

(Are there any other persons who may not be members of your family, like servants, friends, lodgers, but who usually live here)

- Ya, tulis nama dalam daftar (yes, write the name(s) on the list)
  - (kalau ya) Kenapa orang bukan anggota keluarga tinggal dalam rumah tangga ini? (If yes, reason for non-family members to stay in this household)

_____

_____

- Tidak (no)

P.31 Apakah ada saudara lain yang tinggal di sini selama 6 bulan atau lebih? (Are there any other guests or visitors who have been temporarily staying with you for at least six months)

- Ya, tulis nama dalam daftar (yes, write the name(s) on the list)
  - (kalau ya) Kenapa orang bukan anggota keluarga tinggal dalam rumah tangga ini? (If yes, reason for non-family members to stay in this household)

_____

_____

- Tidak (no)

P.32 Apakah ada orang dalam rumah tangga ini, yang sekarang tidak ada, karena mereka keluar 1 s/d 6 bulan? (Are there any persons who usually live here, who have been away for less than six months)

- Ya, tulis nama dalam daftar (yes, write the name(s) on the list)
  - (kalau ya) Kenapa mereka keluar? (If yes, for what reason(s) are they away)

_____

_____

- Tidak (no)

P.33 Ada juga anggota rumah tangga yang masih tercatat di sini, tetapi mereka sudah pergi lebih dari 6 bulan? (Are there any persons we have listed who have been away for more than six months)

- Ya, coret nama anggota ini dari daftar (If yes, remove their name from the list)
  - (kalau ya) Kenapa mereka pergi? (If yes, for what reason(s) are they away)

_____

_____

- Tidak (no)

****

BERTANYA SEMUA PERTANYAAN TAMBAHAN (P.31-P.41) BAGI SEMUA ORANG TERCATAT. PINDAH KE ORANG BERIKUTNYA KALAU SEMUA PERTANYAAN BAGI ORANG YANG TERDAHULU SELESAI. (ASK ALL ADDITIONAL QUESTIONS FOR ALL PERSONS LISTED, SKIP TO isapTHE NEXT PERSON WHEN ALL QUESTIONS FOR THE PRECEDING PERSON ARE FINISHED)

****

P.34 Siapa sebagai kepala keluarga di dalam rumah tangga ini? Kepala keluarga panggil (nama) sebagai apa? (Who is head of the household. What is the relation of (name) to the head of the household)

P.35 (Nama) orang laki-laki atau perempuan? (What is this persons' sex)

P.36 (Nama) lahir tanggal berapa (tanggal: bulan dan tahun)? (What is (name)'s date of birth)(kalau bisa, cek surat kelahiran/daftar baptis/KTP (kartu penduduk)) (check if possible with certificate/register etc.)

P.37 (Nama) berumur berapa tahun sekarang? (How old is (name) now)

P.38 Apakah status perkawinan dari (nama)? (What is the marital status of (name))
1. Belum kawin (single)
2. Kawin (married)
3. Pisah (separated)
4. Cerai (hidup) (divorced)
5. Janda (widowed)

(P.39 S/D P.44 UNTUK ORANG YANG UMUR 6 TAHUN KE ATAS, kalau tidak, pindah ke p.34 kalau masih ada orang yang berikut) (P.39-P.44 only for persons aged 6 years or older, and if not, return to question 34 if there still are other persons on the list)

P.39 Kegiatan sehari-hari (nama) ada apa? What is (name)'s daily activity?
(Satu atau lebih jawaban boleh) (more than one answer is allowed)
1. Pergi ke sekolah (goes to school)
2. Pergi ke kebun/dusun (farming)
3. Cari ikan/berburu (fishing/hunting)
4. Pegawai (guru sekolah, pendeta, pemerintah, ABRI, dll) (civil servant)
5. Pedagang (trader)
6. Pemelik toko/warung (shop-owner)
7. Menjual hasil di pasar (selling crops on market)
8. Ibu rumah tangga (housewife)
9. Pensiun (retired)
10. Lain, yaitu (other, to wit):_____

P.40 (Nama) sudah sekolah sampai kelas berapa? (What is (name)'s highest level of education attended) (isi sekolah dan kelas)
1. Tidak pernah ke sekolah (not (yet) attended school)
2. SD (primary school)
3. SMP/SMEP (lower (economic) secundary school)

4. SMA/SMEA (Ekonomi) (higher (economic) secundary school)
5. STM (Sekolah Teknik) (technical education)
6. JVS/MVS (Jongens/Meisjes Vervolg School)
7. Lain, yaitu (other, to wit):_____

P.41 (Nama) sudah tamat sekolah yang mana? (highest level of education completed)
1. Tidak/belum tamat SD (Did not complete primary school)
2. SD (primary school)
3. SMP/SMEP (lower (economic) secundary school)
4. SMA/SMEA (Ekonomi) (higher (economic) secundary school)
5. STM (Sekolah Teknik) (technical education)
6. JVS/MVS (Jongens/Meisjes Vervolg School)
7. Lain, yaitu (other, to wit):_____

P.42 (kalau putus sekolah) (Nama) putus sekolah karena apa? (if dropped-out of school, for what reason)

_____

P.43 (Nama) bisa berbicara Bahasa Indonesia dengan baik?
(Is (name) able to speak Indonesian) <Ya/Tidak>

P.44a (Nama) bisa membaca surat yang sederhana di suatu bahasa dengan baik? (Can (name) read a simple letter in any language)
<Ya/Tidak>

P.44b (Nama) dapat menulis surat yang sederhana di suatu bahasa dengan baik? (Can (name) write a simple letter in any language) <Ya/Tidak>

ANGGOTA RUMAH TANGGA (HOUSEHOLD DYNAMICS)

P.45 Sejak Tahun Baru 1995 (tanggal 1 Januari 1995), ada bayi-bayi yang lahir di dalam rumah tangga ini? (*Are there any babies born in this household since the first of January 1995. If not, move to question 47*) <Ya/Tidak>
(kalau tidak, pindah ke P 47)

P.46 (kalau ada) (if yes)
- Bayi/anak kecil bernama siapa? (nama kecil dan nama fam) (what is its name)
- Orang tua dari bayi ini bernama siapa? (what are its parents' names)
- Jenis kelamin bayi/anak kecil ini ada apa? (what is its sex)
- Tanggal lahir bayi/anak kecil ada berapa? (what is its date of birth)
- Bayi/anak kecil ini, masih hidup? (is the child still alive)
- (kalau sudah meninggal) Tanggal meninggal bayi ini ada berapa? (if child already died, when did it die)
  (kalau sudah meninggal) Karena apa dia meninggal? (if child already died, what was its reason of death)

Nama (nama kecil + nama fam)	Nama orang tua	kelamin	Tgl. lahir	Masih hidup	kalau tidak, tgl mati	kalau tidak, sebab mati
	Ibu: Bapak:					
	Ibu: Bapak:					
	Ibu: Bapak:					
	Ibu: Bapak:					
	Ibu: Bapak:					

Sebab-sebab anak meninggal? (causes of death):
1. Msatlok (baby-girl born dead, mother still alive)
2. Wsatlok (baby-boy born dead, mother still alive)
3. 'Msois fo magi oli (female child which soon dies after birth)
4. 'Msois fo wagi oli (male child which soon dies after birth)
5. Manissga (mother and child both die during delivery)
6. Komplikasi selama kelahiran (complications during birth)
7. Malaria (khforin/sinas/inik) (malaria)
8. Lain, yaitu (other, to wit):_____

P.47 Tahun 1990 ada Sensus Penduduk dari Pemerintah di sini. Apakah sesudah Sensus itu, ada orang meninggal di rumah tangga ini? <Ya/Tidak>

(kalau tidak, sudah selesai dengan bagian "Rumah tangga umum", terus pindah ke kuestioner "sejarah pindah")

(In 1990 there was a population census from the government here, since that time, did any person die in this household) (if not, the "General household questionnaire" is finished. Continue with "Migration history".)

P.48 (kalau ya) Siapa yang meninggal (nama kecil dan nama fam)? (if yes, who is/are the person(s) who died)
- Kapan dia meninggal (tanggal berapa)? (When did (s)he die)
- Tanggal berapa (nama) lahir? (What is his/her date of birth)
- Ketika dia meninggal, dia berumur berapa tahun? (At what age did (s)he die)
- Orang ini laki[2] atau perempuan? (What was the persons' sex)
- Kenapa dia meninggal? (What was the cause of death)
- Kepala keluarga panggil (nama) sebagai apa? (What was his/her relation to the head of household)
- (Lihat sendiri: orang yang meninggal adalah perempuan yang berumur di antara 15-49 tahun?) (decide for yourself: is the deceased person a woman age 15-49 at time of death) <Ya/Tidak>

Nama (nama kecil dan nama fam)	Tgl. mati	Tgl. lahir	Umur	Kelamin	Sebab Meninggal	HubungKK dng (nama)	Wanita 15-49 thn Y/T
d1							
d2							
d3							
d4							
d5							
d6							

Sebab-sebab meninggal (causes of death):
1. Malaria (khforin/sinas/inik) (malaria)
2. Luka-luka (jafat) (wounds)
3. Batuk-batuk (wgiha) (cough)
4. Suangi (lait)
5. Racun (lilin) (poison)
6. Bunuh diri (whauk sigya/wagi sigya) (suicide)
7. Tangkap buaya (wyar yeit) (caught by crocodile)
8. Lain, yaitu (other, to wit):_____

****

Kalau jawaban adalah "suangi" atau "kehendak Tuhan", coba ambil jawab lagi oleh bertanya tentang cara yang mana sebabkan orang itu meninggal. (Probe in case of "suangi", "poison" or "it was the will of god", through which measurements did suangi/god work that made this person die?)

****

Kalau ada perempuan yang meninggal umur 15-49 tahun, kita perlu lebih latar belakang. Mengisi formulir yang bersangkutan.

(In case of a female death aged 15-49, more background variables need to be known. Fill out the female death form).

****

FORMULIR MENGENAI KEMATIAN PEREMPUAN YANG BERUMUR 15-49 TAHUN PADA SAAT DIA MENINGGAL

(FEMALE DEATH FORM: ONE FOR EVERY FEMALE WHO DIED AT THE AGE OF 15-49 YEARS)

Code identitas: nomor kematian perempuan: (identity code: female death number:)_____

P.49a Apakah (nama) meninggal waktu keadaan hamil? (Did (name) die while pregnant) <Ya/Tidak>
P.49b (kalau selama hamil) Ibu ini sudah hamil berapa bulan pada saat dia meninggal?
(if during pregnancy, how many months was she already pregnant) _____bulan

****

Kalau ya, pindah ke "Sejarah pindah" (if yes, move on to "migration history")
****

P.50 (kalau tidak) Apakah (nama) meninggal selama melahirkan? <Ya/Tidak>
(if not, did (name) die while she was giving birth)
P.51 (kalau tidak) Apakah (nama) meninggal satu/dua hari sesudah melahirkan? <Ya/Tidak>
(Did the death of (name) happen soon after she had delivered a child)

****

Kalau P.50 dan P.51 tidak, pindah ke "Sejarah pindah". Pertanyaan 52-55 hanya kalau ibu meninggal selama melahirkan atau cepat sesudah itu.
(if question 50 and 51 are negatively answered, move on to "migration history" Questions 52-55 are only for women who died during delivery or soon after)
****

P.52 Ibu itu dibantu oleh siapa waktu melahirkan?
(was (name) assisted during the delivery? And if so, who was assisting (name) during the delivery)
Bantu? <Y/T>, kalau ya, bantu oleh:
(lingkar semua orang yang bantu)

1. Dukun (Traditional Birth Attendant)
2. Bidan/ "zuster"/mantri (midwife/nurse)
3. Kader posyandu
4. Dokter (doctor)
5. Mama, tanta, bapak/suami, dll. famili (relative)
6. Lain, yaitu (other, to wit):_____

P.53 (kalau tidak) Kenapa tidak ada bantuan waktu melahirkan? (If not assisted, why not)

_____

P.54 Ibu itu sudah melahirkan berapa kali (termasuk yang ini)?
(how many times did this woman give birth including this one) _____kali

P.55 Ibu itu melahirkan di mana? (Where did the delivery take place)
1. Di rumah (at home)
2. Posyandu/ puskesmas pembantu
3. Puskesmas (Rumah sakit) Teminabuan
4. Lain, yaitu (other, to wit):_____

SEJARAH PINDAH (MIGRATION HISTORY)

(SATU FORMULIR UNTUK SETIAP ORANG DI RUMAH TANGGA INI YANG BERUMUR 18 TAHUN KE ATAS ATAU SUDAH KAWIN)

(ONE FORM FOR EVERY MEMBER OF THE HOUSEHOLD WHOSE AGE IS 18 YEARS OR MORE OR MARRIED)

* Nomor gugusan (cluster no.): * Nomor R.T. (HH no.):
* Nomor desa (village no): * Nomor individu (Ind. no):

* Nama (Name)_____

P.1 Ayah dari (nama) punya tempat lahir di mana? (Can you tell me the place of birth of your father)
Desa (village):_____
P.2 Kecamatan (sub-district):_____
P.3 Propinsi (Province):_____

P.4 Mama dari (nama) punya tempat lahir di mana? (Can you tell me the place of birth of your mother)
Desa (village):_____
P.5 Kecamatan (sub-district):_____
P.6 Propinsi (Province):_____

P.7 (Nama) sendiri lahir di mana? Waktu (nama) lahir, mama dari (nama) tinggal di rumah itu atau tidak? (What is your/(name's) place of birth? Was this the place of usual residence of your mother at that time)
Desa (village):_____
P.8 Kecamatan (sub-district):_____
P.9 Propinsi (Province):_____
P.10Dari sini ke rumah (nama) lahir, berapa lama perjalanan? pergi:_____jam,_____minit
(How long would it take you to go from your house to this place)

P.11 Pada waktu Sensus Penduduk dari Pemerintah tahun 1990, (nama) tinggal di mana? (What was your/(name's) place of residence during the Sensus Penduduk 1990?)
Desa (village):_____
P.12 Kecamatan (sub-district):_____
P.13 Propinsi (Province):_____
P.14 (kalau tempat tinggal thn 1990 dan hari ini tidak sama) Dari sini ke tempat itu (tempat tinggal pada tahun 1990), berapa lama dalam perjalanan?
pergi:_____jam,_____minit
(How long would it take you to go from your house to this place)

****

PERTANYAAN 15-21: HANYA UNTUK IBU/BAPAK YANG TELAH KAWIN, TETAPI BUKAN JANDA ATAU CERAI (QUESTION 15-21 FOR CURRENTLY MARRIED PERSONS ONLY)

****

P.15 Suami ibu/ Isteri bapak pergi untuk lebih dari enam bulan? (Is your husband/wife away for more than six months)

(kalau tidak, pindah ke P.22) <Ya/Tidak>

P.16 Bapak/Ibu pergi sudah berapa lama? _____bulan

(For how long is (s)he already away)

P.17 Untuk apa? (For what reason)_____

_____

P.18 Dia pergi ke mana?_____

(Where did (s)he go to)

P.19 Kecamatan (sub-district):_____

P.20 Propinsi (Province):_____

P.21 Tempat itu, berapa jam jalan dari desa ini? _____jam

(Traveling time to that village)

****

(KALAU IBU/BAPAK PUNYA ANAK^2, BERTANYA P.22 DAN P.23, JIKA TIDAK, PINDAH KE P.24. Jangan hitung anak-anak dua kali: kalau Ibu ada, bertanya P.22 dan P.23 kepada dia saja. (CHECK IF PERSON HAS CHILDREN, IF SO ASK Q.22 AND Q.23, OTHERWISE SKIP TO Q.24; heed double counting of children; in case the woman is present, take the data from her)

****

P.22 Ibu/Bapak punya anak yang belum kawin yang sekarang tidak tinggal di sini lebih dari enam (6) bulan? <Ya/Tidak>

(Do you have any unmarried children currently not living with you and away for more than 6 months)

P.23 (kalau ya) (if yes)
- (A) Itu siapa? Dia bernama apa? (what is his/her name)
- (B) Tanggal berapa dia lahir? (what is his/her date of birth)
- (C) Dia sudah pergi berapa bulan? (how long is (s)he already away)
- (D) Dia tamat sekolah tertinggi yang mana? (what is his/her highest level of education completed)
- (E) Kenapa dia pergi? (for which reason did (s)he go)
- (F) Dia pergi ke mana? (where did (s)he go to)

(A) Nama (kecil dan fam)	(B) Tgl. lahir	(C) Sudah pergi berapa bulan	(D) Tamat sekolah ter-tinggi	(E) Kenapa pergi	(F) Pergi ke mana

P.24 Apakah Ibu/Bapak pernah pindah sejak tahun 1990 (Sensus Penduduk Pemerintah) sampai sekarang? <Ya/Tidak>
(Kalau tidak, "Sejarah pindah" selesai, lihat halaman 15 - catatan. Terus dengan "Kawin dan kesuburan".)

(Did you/(name) move in between the Sensus Penduduk 1990 and now? (All short and long term movements should be included except short (family-) visits, hospitalization etcetera.) If not, the questionnaire on "migration history" is finished. Move on to "Marriage and fertility questionnaire".)

****

Kalau orang ini pindah dua kali atau lebih: dulu selesai semua pertanyaan sebelum pergi ke tempat pindah berikutnya. (if this person moved two times or more, first finish all questions before skipping to the next movement)

P.25 (kalau pindah) (if moved)

- (A) Ibu/Bapak pindah ke mana? Bisa sebut semua tempat tinggal antara 1990 dan sekarang? (to which places did you move to)
- (B) Tanggal berapa pindah pertama kali (yang kedua, dstnya)? (when did you move, when moving to the first (second, ...) place)
- (C) Untuk apa pindah ke sana? (why did you go to this place)
    1. karena kawin (marriage)
    2. untuk kerja (work)
    3. sekolah (schooling)
    4. diangkat orang (adoption)
    5. tinggal dengan famili (tidak temasuk yang pindah karena kawin) (live with family other than when newly wed)
    6. lain, yaitu (other, to wit):_____
- (D) KETERANGAN (remarks)

Tahun 1990 Ibu/Bapak tinggal di desa:_____

(place of residence in 1990.)

	(A) Desa: Kecamatan:	(B) Tgl.pindah	(C) Kenapa ke sana	(D) Keterangan
1	Desa: Kecamatan:			
2	desa: Kecamatan:			
3	Desa: Kecamatan:			
4	Desa: Kecamatan:			
5	Desa: Kecamatan:			
6	Desa: Kecamatan:			

P.26 (kalau pindah untuk kerja) Sebelum pindah ke desa itu, Ibu/Bapak sudah tahu tentang kesempatan untuk kerja di sana? (If the move is because of working purposes, did you/(name) know something about the opportunities in the place(s) of destination before you/(name) went there) <Ya/Tidak>

(kalau tidak, pindah ke halaman 17: "catatan") (if not, move to page 17: "remarks concerning household)

P.27 (kalau ya) Oleh siapa atau bagaimana Ibu/Bapak sudah tahu ini? (satu atau lebih jawaban boleh) (If yes, what was your/his/her source of information?) (more than one answer may be ticked)

1. Famili/teman (Relatives/friends)
2. "Boss" yang cari (Job-hunters)
3. Melamar (solliciteren)
4. Lewat radio/TV (radio/television)
5. Pergi lihat sendiri (Visits of person self to place of destination before migration)
6. Surat kabar (newspaper)
7. Lain, yaitu (other, to wit):_____

CATATAN KHUSUS TENTANG RUMAH TANGGA INI (remarks concerning household)

_____
_____
_____

CATATAN TENTANG WAWANCARA INI (remarks concerning interview)

- Siapa hadir (ibu+bapak; ibu sendiri; ibu+ teman-teman, etc.)
- Gampang/sulit

_____
_____
_____

KUESTIONER: KAWIN DAN KESUBURAN

(marriage and fertility questionnaire)

(SATU FORMULIR UNTUK SETIAP PEREMPUAN PERNAH KAWIN YANG TINGGAL DI RUMAH TANGGA INI) (one form for every ever-married woman in the household)

* Nomor gugusan (Cluster no.):
* Nomor desa (Village no.):
* Nomor R.T. (HH no.):
* Nomor ibu (Ind. no.):

KAWIN (MARRIAGE)
Sejarah perkawinan (Marital history of)
Nama kecil (firstname):.....
Nama fam (lastname):.....

P.1 Ibu sudah kawin, ya. Ibu sudah kawin berapa kali? (I know that you are or have been married. How many times have you been married) _____kali

P.2 Sebelum berbicara tentang perkawinan Ibu, saya ingin tahu Ibu berumur berapa tahun mendapat haid pertama kali. (Before discussing some facts about your marriage(s), I would like to know how old you were when you had your first menses)

Pertama kali haid: 1. umur ibu_____ tahun
2. tidak tahu

(A)	(B)		(C)	(D)	(E)	(F)
No. kawin	Umur pada saat kawin: Isteri	Suami	Tanggal bln/thn kawin	Bapak dan Ibu masih bersama?	Kapan cerai/ janda	Lama-nya kawin
1						
2						
3						

(CEK JUMLAH PERKAWINAN DI BAGIAN (A) DAN TANYA SEMUA PERTANYAAN YANG BERIKUT (B) S/D (F) BAGI SETIAP KAWIN SAMPAI SELESAI SEBELUM PINDAH KE SUAMI BERIKUTNYA (TICK IN (A) THE NUMBER OF MARRIAGES AND ASK ALL FOLLOWING QUESTIONS (B)-(F) FOR EACH MARRIAGE BEFORE SKIPPING TO THE NEXT HUSBAND)

P.3 (B) Ibu (nama), waktu kawin pertama kali, Ibu (nama) berumur berapa tahun? [Waktu kawin kedua, Ibu berumur berapa tahun?] (How old were you when you married for the first (second, etc. time)

P.4 Waktu Bapak kawin dengan Ibu (nama), Bapak berumur berapa tahun? (And how old was your husband when he married you)

P.5 (C) Pada bulan apa dan tahun berapa Ibu (nama) dan Bapak kawin? (On which date/In which year did you marry (name))
(CEK KALAU JAWABAN (B) DAN (C) CONSISTEN)

P.6 Apakah Ibu punya surat perkawinan (nikah gereja)? (kalau ya) Saya bisa lihat? (Are there any marriage papers)
(Kalau ya, cek tanggal/If so, check data)
Perkawinan pertama (first marriage) <Ya/Tidak>; tanggal
mendaftarkan_____(bulan/tahun)
Perkawinan kedua (second marriage) <Ya/Tidak>; tanggal
mendaftarkan_____(bulan/tahun)
Perkawinan ketiga (third marriage) <Ya/Tidak>; tanggal
mendaftarkan_____(bulan/tahun)

****

KALAU TANGGAL KAWIN MENDAFTARKAN TIDAK SAMA DENGAN TANGGAL IBU TADI JAWAB, BERTANYA TANGGAL KAWIN SEKALI LAGI

(IF THE DATE OF MARRIAGE RECORDED IN THE REGISTER DOES NOT CORRESPOND WITH THE ONE GIVEN BY THE RESPONDENT, CHECK THE ANSWER AGAIN)

****

P.7 (D) Bapak dan Ibu sekarang masih hidup bersama? (Are you still married to each other) <Ya/Tidak>

P.8 (kalau tidak) Kenapa tidak? (If no, why not)
1. Bapak meninggal (husband died)
2. Pisah (seperated)
3. Cerai (divorced)
4. Lain, yaitu (other, to wit):_____

P.9 (kalau pisah atau cerai) Kenapa Ibu dan Bapak bercerai? (If seperated or divorced, for what reason)
Nomor perkawinan (marriage no.) :..... sebab (reason),_____
_____
Nomor perkawinan (marriage no.) :.... sebab (reason),_____
_____

P.10 (E) (kalau cerai atau janda) Itu tanggal dan tahun berapa? (If divorced or widowed, when was the marriage dissolved)

P.11 (F) Ibu dan Bapak sudah kawin berapa tahun? (How long have you both been married now)

****

KALAU IBU KAWIN LEBIH DARIPADA SATU KALI, MENGULANGI PERTANYAAN 3 S/D 11 UNTUK SETIAP SUAMI YANG BERIKUTNYA. JIKA TIDAK, TERUS DENGAN PERTANYAAN 12.

IF MORE THAN ONE MARRIAGE, REPEAT QUESTIONS 3-11 FOR THE NEXT HUSBAND ON THE LIST; OTHERWISE CONTINUE WITH Q.12

****

P.12 Untuk Bapak (suami dari ibu sekarang), Ibu adalah isteri pertama? (Has your current husband been married to another wife before he married you?)
(kalau ya, pindah ke pertanyaan 15 if yes, move on to Q.15) <Ya/Tidak>

P.13 (kalau tidak) Berapa kali bapak sudah kawin? (If yes, how many times did your husband marry) _____kali

P.14 Isteri pertama dari bapak, apa ada hubungan dengan
Ibu (nama)? (How is the first wife related to you) Hubungan:_____
Isteri kedua dari bapak, apa ada hubungan dengan
Ibu (nama)? (How is the first wife related to you) Hubungan:_____

KESUBURAN (fertility)

P.15 Apakah Ibu punya anak-anak? (do you have any children) <Ya/Tidak>

Kalau belum, kenapa belum? (if not (yet), what is the reason)_____
_____

(kalau belum punya anak) Ibu sudah pernah hamil? <Ya/Tidak>
((if there are no children) have you ever been pregnant)

****

Kalau Ibu sudah pernah HAMIL satu kali atau lebih, pindah ke P.20, kalau tidak, pindah ke P.29. (if the woman has ever been pregnant, skip to Q.20, if not, skip to Q.29)

****

P.16 (kalau ya) (if yes)
- Berapa anak kandung masih hidup? masih hidup_____
(how many of your biological children are still alive)
- Berapa anak kandung sudah meninggal? sudah meninggal_____
(how many of your biological children have already died)
- Jumlah anak kandung berapa? jumlah_____
(total number of biological children)
- Apakah ibu punya anak tiri/angkat/piara? <Ya/Tidak>
(do you have any step/adoptive/foster children)
- (kalau ya) Berapa anak tiri/angkat/piara ibu punya? jumlah_____
((if yes) how many step/adoptive/foster children do you have)

(Kalau anak tiri/angkat/piara tidak ada atau sudah meninggal, pindah ke P.18)
(if there are no step/adoptive/foster children or they have already died, skip to Q.18)

P.17 (Kalau ibu punya anak tiri/angkat/piara yang masih hidup)

(If any step/adoptive/foster children who are still alive)

- (A) Ibu bisa sebutkan nama anak-anak itu. (what are their names)
- (B) Ibu panggil anak ini sebagai apa? (anak tiri/angkat/harta/piara) (what is their relation to you step/adoptive/foster)
- (C) Nama Ibu dan Bapak kandung dari (nama) ada siapa? (what are the names of the childs' biological parents)
- (D) (Nama) lahir tanggal berapa? (what is its date of birth)
- (E) (Nama) laki-laki atau perempuan? (is it a boy or a girl)
- (F) Kenapa anak ini tinggal di rumah tangga ini? (what is the reason (s)he lives here)

(A) Nama (kecil dan fam)	(B) Ibu panggil anak sebagai	(C) Nama Ibu dan Bapak kandung	(D) Tgl lahir	(E) kelamin	(F) Kenapa anak tinggal di sini
		Ibu: Bapak:			
		Ibu: Bapak:			
		Ibu: Bapak:			
		Ibu: Bapak:			

* If applicable:

Pregnancy history

Rank no. preg (A)	Rank no. marr (B)	Dura-tion preg (C)	Out-come preg (D)	If not alive, for what reason (E)	If born alive, date of birth (F)	Child still alive (Y/N) (G)	If child no longer alive, what was the cause of death (H)	If dead, date of dying (I)	Used KB before pregnancy (Y/N) (K)
p1									
p2									
p3									
p4									
p5									
p6									
p7									
p8									
p9									
p10									
p11									
p12									
p13									
p14									

P.18 (A) Ibu sudah hamil berapa kali? Termasuk kehamilan yang tidak lengkap, juga bayi yang sudah meninggal, dan juga anak yang sekarang tidak tinggal di rumah tangga ini.

(How many times have you been pregnant altogether, including the ones which lasted only a short while, the babies who already died or who no longer live in this household)

P.19 (B) (kalau Ibu kawin dua kali atau lebih) Dengan suami pertama, ibu hamil berapa kali? Dengan suami kedua (dan seterusnya), ibu hamil berapa kali?

If the woman has been married more than once: How many pregnancy did occur during your (first/second etc.) marriage?

****

CEK JUMLAH HAMIL IBU SEBUT. KEMUDIAN, BERTANYA SEMUA PERTANYAAN MENGENAI SETIAP HAMIL SEBELUM PINDAH KE HAMIL YANG BERIKUT. MENGISI TABEL. (TICK THE NUMBER OF PREGNANCIES MENTIONED BY THE WOMAN. AFTERWARDS, ASK ALL QUESTIONS CONCERNING THE PREGNANCY BEFORE SKIPPING TO THE NEXT ONE. FILL OUT THE SCHEME.

****

****

BILANG DEFINISI KELAHIRAN HIDUP

Dimaksudkan dengan "kelahiran hidup" adalah kelahiran bayi pada apa bayi menunjukkan tanda-tanda kehidupan, seperti bernapas, denyutan jantung.

(GIVE THE DEFINITION OF A LIVE BIRTH: a live birth is a birth where a baby shows any sign of live, such as breathing or heartbeating)

****

"Kita mulai dengan hamil Ibu yang pertama".....(To start with your first pregnancy...)

"Kemudian, waktu hamil yang kedua".....(dan seterusnya) when speaking about your second (next) pregnancy.....)

P.20 (C) Ibu hamil pertama (dstnya), sampai berapa bulan?

How long did this first (second, etc.) pregnancy last? (in months)

P.21 (D) Ibu hamil pertama kali (dstnya), apa jadi? What was the outcome of this pregnancy?

1. Anak lahir hidup (live birth)
2. Anak lahir mati (still birth)
3. Anak mati dalam kandungan/miskram (miscarriage), pindah ke P.28
4. Pengguguran (yang disengajai) (abortus provocatus), pindah ke P.28

P.22 (E) (kalau anak lahir mati) Ibu tahu kenapa anak ini lahir mati?

If the child was not born alive, what was the reason why the child was not born alive?

Pindah ke P.28.

P.23 (F) (kalau anak lahir hidup) (Nama) lahir tanggal berapa?

If the child was born alive, what was the date of birth of this child?

P.24 (G) (kalau anak lahir hidup) Anak ini masih hidup sampai sekarang?

(If the child was born alive, is the child still alive)

P.25 (J) (kalau anak lahir hidup) Ibu menyusui anak itu selama berapa bulan? (If the child was born alive, for how long did you breastfeed her/him? (in months))
Pindah ke P.28.

P.26 (H) (kalau anak ini sudah meninggal) Kenapa (nama) meninggal? (If the child is no longer alive, what was the cause of death of this child)

P.27 (I) (kalau anak ini sudah meninggal) Tanggal berapa (nama) meninggal? (If the child is no longer alive, at what date did this child die)

P.28a (K) Sebelum Ibu jadi hamil ini, ibu (bersama Bapak) pakai KB atau cara lain untuk tidak jadi hamil? <Ya/Tidak>

Before the time of this pregnancy, where you and your husband taking any measures to plan(time) or prevent a pregnancy)
(kalau ya) Cara yang mana Ibu dan Bapak pakai? (if yes, which measures did you take)
1. KB-kampung (traditional practises)
2. Suntik (prikpil)
3. Pil (Pill)
4. Spiral (IUD)
5. Kondom (Condom)
6. Masa subur/tanggal bahai/pakai kalender (Rhythm)
7. Sengaja tidak tidur bersama (Abstinence)
8. Susut/Norplant (Norplant)
9. Pemandulan wanita (Sterilization woman)
10. Pemandulan pria (Sterilization man)
11. Lain, yaitu (other, to wit):_____

P.28b (kalau ya) Apakah Ibu/Bapak sengaja untuk lalai berKB sehingga Ibu jadi hamil? (Did you intend to become pregnant) <Ya/Tidak>

****
HAMIL BERIKUTNYA ADA? MULAI DENGAN P.20 SATU KALI LAGI
****

P.29 (kalau masih kawin) Ibu (bersama Bapak) pakai obat KB atau cara lain sekarang? (If still married, do you and your husband take any measures to prevent a pregnancy at this moment)
Kalau tidak, pindah ke P.31. <Ya/Tidak>

P.30 (kalau pakai KB atau cara lain) Ibu pakai obat KB atau cara yang mana? If yes, what kinds of contraceptive do you use, or what measures do you (so either wife or husband) take?
1. KB-kampung (traditional practises)
2. Suntik (prikpil)
3. Pil (Pill)
4. Spiral (IUD)
5. Kondom (Condom)
6. Masa subur/tanggal bahai/pakai kalender (Rhythm)
7. Sengaja tidak tidur bersama (Abstinence)

8. Susut/Norplant (Norplant)
9. Pemandulan wanita (Sterilization woman)
10. Pemandulan pria (Sterilization man)
11. Lain, yaitu (other, to wit):_____

P.31 (kalau tidak pakai obat KB atau cara lain) Kenapa Ibu tidak pakai KB atau cara lain? (If no, why not)
1. Hamil sekarang (Currently pregnant)
2. Mau hamil (Wish to become pregnant)
3. Menopausal/ sudah tidak subur (menopausal)
4. Terlalu mahal (too expensive)
5. Bukan tersedia/ habis (not available)
6. Tidak cocok (does not feel okay when using it)
7. Lain, yaitu (other, to wit):_____

P.32 Kalau Ibu bisa pilih sendiri, Ibu mau berapa anak? (If you could choose exactly the number of children to have in your whole life, how many would that be) _____

****

KALAU IBU BELUM PERNAH MELAHIRKAN, WAWANCARA SELESAI! (IF THE WOMAN NEVER HAS GIVEN BIRTH, THE INTERVIEW IS FINISHED)

****

"Pertanyaan berikutnya ada hanya tentang melahirkan anak terakhir/ anak bungsu" ("the following questions concern your last born child")

P.33 Siapa bantu Ibu waktu melahirkan anak terahkir? (If any children, who assisted you by your latest delivery)
1. Dukun (TBA)
2. Bidan/ "zuster"/mantri (midwife/nurse)
3. Kader posyandu
4. Dokter (doctor)
5. Mama, tanta, bapak, dll. (famili) (relative)
6. Tidak ada orang (no-one)
7. Lain, yaitu (other, to wit):_____

P.34 Waktu hamil terahkir, Ibu dapat diperiksa? (Did you ever have a check-up during your last pregnancy) <Ya/Tidak>

(kalau tidak, pergi ke P.38)

P.35 (kalau ya) Berapa kali Ibu dapat diperiksa? (if yes, how often have you been checked) _____kali (times)

P.36 (kalau ya) Siapa yang periksa Ibu? (If yes, who did this check-up)
1. Dukun (Traditional birth attendant)
2. Bidan/"zuster"/mantri (Midwife/nurse)
3. Kader posyandu
4. Dokter (Doctor)

5. Lain, yaitu (Other, to wit):_____

P.37 Dia periksa apa saja? (Lebih daripada satu jawab boleh) (What was done during the check-up) more than one answer is allowed

1. Timbang berat badan (Checking weight)
2. Periksa tensi (darah) (Checking blood-pressure)
3. Periksa air kecil (Checking of urine (on sugar and albumen)
4. Periksa besarnya perut/kandungan (Checking size of uterus)
5. Vaksinasi tetanus (Tetanus vaccination)
6. Periksa Habe (Hb) (Check-up of Hb-level/anaemia)
7. Lain, yaitu (Other, to wit):_____

P.38 Ibu melahirkan anak terakhir di mana? (Where did you deliver your last-born child)

1. Di rumah (At home)
2. Posyandu /Puskesmas pembantu
3. Puskesmas/ "rumah sakit" Teminabuan
4. Lain, yaitu (Other, to wit):_____

P.39 Sesudah Ibu melahirkan anak yang terakhir, berapa bulan lagi sampai ibu dapat haid kembali? (After how many months after this last delivery did your menses return) _____bulan (months)

P.40 Ibu menyusui anak yang terahkir? <Ya/Tidak>
(Did you breastfeed your last-born child)

P.41 (kalau tidak menyusui) Kenapa tidak? (If no breastfeeding, why not)

_____

_____

P.42 (kalau kasih susu) Ibu kasih susu pertama (kuning) untuk anak juga? (If yes, did you give the colostrum to the child) <Ya/Tidak>

P.43 (kalau tidak) Kenapa Ibu tidak kasih susu kuning? (if no, why did you not give the colostrum to the child)

P.44 Anak itu dapat makanan tambahan atau disamping susu, mulai dengan umur berapa (bulan)? (At what age did you start giving the child supplemetary feeding (either drinks or food)) _____months

Appendix 3.1

Table 1 **Educational attainment of males in the urban areas (in %), Irian Jaya 1990**

Age group	Completed Primary School	Lower Secondary School	Upper Secondary School	University
15-19	35.0	51.2	4.4	-
25-29	17.5	16.4	48.9	3.6
35-39	22.1	17.6	37.3	4.6
45-49	28.1	15.8	24.8	5.8
55-59	35.3	11.3	12.9	2.0

Source: *BPS*, 1992, p. 16.

Table 2 **Educational attainment of females in the urban areas (in %), Irian Jaya 1990**

Age group	Completed Primary School	Lower Secondary School	Upper Secondary School	University
15-19	31.2	50.6	6.5	-
25-29	24.7	16.1	33.1	2.6
35-39	26.1	19.8	24.1	0.7
45-49	33.4	11.9	11.1	0.4
55-59	28.1	6.8	4.3	-

Source: *BPS*, 1992, p. 17.

Table 3 **Educational attainment of males in the rural areas (in %), Irian Jaya 1990**

Age group	Completed Primary School	Lower Secondary School	Upper Secondary School	University
15-19	42.4	13.6	1.4	-
25-29	24.9	8.8	13.1	0.6
35-39	18.9	5.9	8.3	0.3
45-49	13.5	3.7	2.5	0.2
55-59	10.1	1.8	1.6	0.0

Source: *BPS*, 1992, p. 19.

Table 4 **Educational attainment of females in the rural areas (in %), Irian Jaya 1990**

Age group	Completed Primary School	Lower Secondary School	Upper Secondary School	University
15-19	32.3	9.4	1.1	-
25-29	17.6	4.1	3.9	0.2
35-39	11.5	2.3	2.2	0.0
45-49	6.5	0.8	0.7	-
55-59	3.9	0.1	0.1	-

Source: *BPS*, 1992, p. 20.

Table 5 **Population of men 10 years of age and above by age group and marital status, Irian Jaya 1990**

Age group	*Marital status*				Total
	Single	Married	Divorced	Widowed	
10-14	103,482	942	126	98	104,648
15-19	80,022	2,495	99	50	82,666
20-24	45,613	20,719	246	366	66,944
25-29	24,917	54,733	715	848	81,213
30-34	7,366	58,039	885	1,360	67,650
35-39	3,003	53,753	845	1,723	59,324
40-44	1,624	37,041	744	2,481	41,890
45-49	921	27,228	488	1,819	30,456
50-54	737	16,921	390	2,245	20,293
55-59	381	10,458	222	1,462	12,523
60-64	289	6,227	170	1,436	8,122
65-69	237	3,031	115	752	4,135
70-74	194	1,235	60	511	2,000
75+	387	1,023	191	519	2,120
Total	269,173	293,845	5,296	15,670	583,984

Source: *BPS*, 1992, p. 6.

Table 6 **Population of women 10 years of age and over by age group and marital status, Irian Jaya, 1990.**

Age group	*Marital status*				Total
	Single	Married	Divorced	Widowed	
10-14	84,518	311	25	-	84,854
15-19	52,604	18,402	337	143	71,486
20-24	20,106	52,058	1,186	570	73,920
25-29	6,778	78,758	1,758	1,599	88,893
30-34	1,929	57,702	1,600	2,336	63,567
35-39	977	48,823	1,441	3,805	55,046
40-44	527	26,865	891	4,588	32,871
45-49	232	17,717	737	5,024	23,710
50-54	239	9,568	411	5,232	15,450
55-59	96	5,792	184	3,601	9,673
60-64	155	2,752	218	3,512	6,637
65-69	136	1,208	43	2,041	3,428
70-74	93	455	45	912	1,505
75+	209	460	21	1,110	1,800
Total	168,599	320,871	8,897	34,473	532,840

Source: *BPS*, 1992, p. 6.

Table 7 **Illiteracy rate of population aged 10 years and above by age group, urban/rural, and sex, for the province of Irian Jaya, and the district of Sorong, 1990**

Age group	*Urban*			*Rural*		
	Male	Female	Total	Male	Female	Total
10-14	2.2	1.6	1.9	13.1	16.6	14.7
15-19	1.3	2.3	1.8	16.6	29.0	22.5
25-29	2.2	6.0	3.9	31.0	50.9	41.9
35-39	3.7	8.5	5.8	47.9	65.0	56.3
45-49	5.2	16.7	9.7	59.5	73.7	65.9
50+	10.9	30.7	19.6	59.5	76.5	66.9
Total Irian Jaya	3.1	7.1	4.9	33.5	47.7	40.4
Sorong	2.4	5.6	3.8	18.1	27.0	22.4

Source: *BPS*, 1992, pp. 46-53.

Table 8 **Gross regional domestic product, Irian Jaya and Indonesia, 1992 (in %)**

Sector	Irian Jaya	Indonesia
Agriculture	16.4	19.5
Mining & quarrying	55.6	11.5
Manufacturing	2.1	21.8
Electricity, gas, water	0.4	0.8
Construction	4.3	5.9
Trade, restaurants, hotels	5.3	16.4
Transport & communication	4.1	6.6
Banks & finance	0.9	4.8
Rents	0.6	2.5
Government	9.2	6.7
Other	1.0	3.5

Source: Barlow, 1997, p. 5.

Appendix 6.1

Table 1 **Irian Jaya: transmigration targets and achievements, 1964-86**

	Target (no. of households (hh)		*Realization as of August '86*		
	Initial	Revised	No. of households	% of original target	No. of persons
Up to *Repelita* III (1964-78)	(1,527)[a]	-	1,527	a	6,291[b]
Repelita III (1979-83/4)	20,000	19,324	19,156	96	78,406
Repelita IV					
Year 1	21,900	14,201	2,177	10	10,191
Year 2	16,400	8,125	120		
Year 3	25,500	3,105	1,303[c]	5	5,160
Subtotal	63,800	25,431	3,600	6	15,351
All years (1964-Aug '86)	85,327	n.a.	24,283	36	100,048

Source: Manning and Rumbiak, 1989, p. 99.

[a] /a No data on targets in the early years is available.

[b] This is an estimate.

[c] Till August 1983.

n.a. =not available

Samenvatting

Demografisch survey onderzoek in Irian Jaya. Bevolkingsdynamiek van de inwoners van het onderdistrict Teminabuan op Vogelkop schiereiland, Irian Jaya, Indonesië.

Inleiding

Gelegen in de meest oostelijke provincie van Indonesië is Teminabuan een nietig plaatsje in het licht van de Indonesische archipel. Het leven ziet er nog goeddeels uit zoals reeds tientallen jaren geleden beschreven door Nederlandse bestuursambtenaren. Het gebied wordt gekarakteriseerd door sago-moerassen, tropisch regenwoud, vele kleine rivieren en smalle voetpaden, en kleine, verspreid liggende nederzettingen. De dagelijkse arbeid bestaat voor de meesten vooral uit het verbouwen van gewassen voor eigen gebruik. Eventuele kleine overschotten worden verkocht en bieden zo de mogelijkheid om producten zoals suiker, thee, koffie, kerosine, kleren te kopen en schoolgeld of contributie aan de kerk te betalen. Het sociale leven wordt voor een groot gedeelte georganiseerd rond de Protestantse kerk. Kerstening heeft vanaf de eerste helft van deze eeuw plaats gevonden, en is zeer succesvol gebleken onder de Papoea's. Het is gebruikelijk dat de dorpelingen door de week op hun tuinen werken *en wonen* en 's zaterdags naar het dorp komen met het doel de kerkdienst op zondag bij te wonen. Daarna vertrekt men weer naar de tuinen. Voor de mensen die in de dorpen blijven zijn er in de namiddag vaak religieuze bijeenkomsten. Hiertegenover staat dat er ook groeperingen zijn wiens leven anders is ingedeeld. Dit geldt bijvoorbeeld voor de Moslim minderheid afkomstig van andere Indonesische eilanden en met een heel andere sociaal-economische achtergrond. Zij leven in het administratieve centrum van het onderdistrict en verrichten vaak geschoold werk.

Het demografisch onderzoek zoals in dit boek beschreven maakt deel uit van een interdisciplinair programma betreffende Vogelkop schiereiland. Dit onderzoek combineert antropologisch, archeologisch, bestuurskundig, demografisch, (etno-)botanisch, geologisch, en linguistisch onderzoek. Binnen het Vogelkop gebied is de zuidwestelijke Teminabuan regio geselecteerd als onderzoeksgebied voor de disciplines antropologie, bestuurskunde en demografie. Deze keuze is gemaakt op basis van het feit dat het thema van de sociale wetenschappen is gedefinieerd als 'movements of objects, persons, relationships, and ideas', waarvoor Teminabuan een uitgelezen plek leek daar sommige rapporten van bestuursambtenaren suggereren dat Teminabuan als poort fungeerde via de welke bovengenoemde bewegingen plaats vonden.

Doelstelling

De vier belangrijkste vragen van dit demografisch onderzoek zijn:

1. *Wat is het niveau van de vruchtbaarheid en de sterfte, en hoe zien de migratie-patronen eruit van de bevolking in de zuidwesthoek van Vogelkop schiereiland op Irian Jaya?*

2. *Op welke wijze wordt de bevolkingssamenstelling beïnvloed door de sterfte, vruchtbaarheid en migratie?*

3. *Hoe verhoudt de demografie zoals aangetroffen in de Vogelkop zich tot die van Indonesië en Papua Nieuw Guinea?*

4. *Wat is de meest effectieve manier waarop demografische gegevens en gezondheidsdata op grote schaal verzameld kunnen worden in een gebied met een geringe toegankelijkheid en een grote mobiliteit van de bevolking?*

Hiernaast wordt onderzocht op welke wijze informatie kan worden uitgewisseld met onderzoek in de antropologie en bestuurskunde.

Onderzoeksgebied en onderzoeksbevolking

Het onderdistrict Teminabuan is gelegen aan de zuidwestzijde van Vogelkop schiereiland, aan de monding van de zeearm de Kaibus. Met zijn vele vertakkingen zorgt die ervoor dat de getijden in een uitgestrekt gebied merkbaar zijn. Deze aftakkingen en andere in het gebied aanwezige rivieren bieden, naast voetpaden, de belangrijkste manier van vervoer. Prauwen zijn meestal uitgeholde boomstammen. De sago-moerassen aan de zuidkust gaan meer noordwaarts over in een geaccidenteerd karstgebied. Doordat de leemgronden slecht water-doorlatend zijn, wordt moerasvorming bevorderd. Veel van de grond in het gebied is daarom ongeschikt voor landbouw. Wel leveren de sago-moerassen het sago, wat voor velen het hoofdbestandeel van het voedsel is. Buiten de sagomoerassen is er tropisch regenwoud. Het klimaat kenmerkt zich door een constante hoge temperatuur (nooit beneden de 18°C) en het ontbreken van een droge periode.

De bevolking woont in kleine, verspreid liggende dorpen van gemiddeld 300 inwoners. Toch zijn veel van die dorpen meer een administratieve eenheid dan een werkelijk dorp. Feit is dat veel dorpelingen door de week op hun tuinen werken en wonen, welke verspreid liggen rond het dorp. De afstand kan echter aanzienlijk zijn, te meer daar dit altijd uitgedrukt wordt in de tijd die ervoor nodig is om er te komen. Ook zijn de mensen gewoon aan het leven in kleine eenheden. Een huishouden bestaat gemiddeld uit 4,4 personen, en in ongeveer 30 procent van de gevallen wonen er meerdere huishoudens in één huis (in het dorp). Omdat veel huishoudens overdag of zelfs voor enkele dagen aaneen op hun tuinen werken of uit vissen

zijn, is de mate van het dicht op elkaar wonen minder dan wat de cijfers in eerste instantie doen vermoeden.

De voornamelijk laag geschoolde bevolking leeft onder de meest eenvoudige omstandigheden. Hun huizen zijn opgebouwd uit materiaal wat in de omgeving te vinden is, en men leeft van wat het land en water hen oplevert. Andere, wat luxure benodigdheden zoals koffie, thee, suiker, en kleding kunnen enkel gekocht worden als de tuinen, of soms de visserij, genoeg opleveren zodat een gedeelte van de opbrengst verkocht kan worden. De merendeels beter geschoolde inmigranten wonen geconcentreerd in het administratieve centrum van het onderdistrict waar het gezinshoofd vaak een betrekking heeft bij de lokale overheid, in de gezondheidszorg, in het voortgezet onderwijs, of een winkel runt.

Met het verschil locale bevolking versus immigrant dient zich ook meteen (ruwweg) het verschil aan in etniciteit (Papoea versus Makassar, Ambonees, Javaan, etc.), in religie (Christen versus Moslim), en in taal (Tehit versus talen van de andere eilanden en een goede beheersing van het *Bahasa Indonesia* onder de immigranten). Deze grote verschillen maken de samenleving vatbaar voor sociale onrust zoals nu pijnlijk gedemonstreerd wordt op Ambon en Kalimantan.

Methoden en technieken

Nieuwe kwantitatieve en kwalitatieve informatie was vereist om de eerdergenoemde onderzoeksvragen te kunnen beantwoorden. Via survey onderzoek (mei-september 1996) zijn de kwantitatieve gegevens verzameld welke aangevuld en deels gestuurd werden door kwalitatieve gegevens verkregen middels het interviewen van zogenaamde '*key-informants*' (survey team, dorpelingen, lokale overheidsambtenaren) over bepaalde onderwerpen. Dit alles is aangevuld met literatuurstudie en verwijzingen naar secundaire databronnen. Het veldwerk bestond uit het verrichten van een bevolking survey onder zo'n 1400 huishoudens (ca. 6200 personen). Dit verschafte een voldoende basis voor de benodigde demografische analyses. De survey is gehouden in 20 van de 31 dorpen van het onderdistrict Teminabuan.

Daar aanwas en afname van de bevolking, naar leeftijd en geslacht, bepalend zijn voor de samenstelling van de bevolking, werden vruchtbaarheid, sterfte, en migratie bestudeerd. Tijdens de analyses is rekening gehouden met de context van de onderzoekspopulatie. Sterfte (Hoofdstuk 4) en vruchtbaarheid (Hoofdstuk 5) en de variabelen die hierop van invloed zijn, zijn bestudeerd middels de modellen van Mosley en Chen (1984) en Bongaarts en Potter (1983).

Het model van Mosley en Chen (1984) is toegepast om de achtergrond van sterfte te analyseren. Het omvat een lijst van directe en sociaal-economische factoren betreffende sterfte voor het vijfde levensjaar. Bij het beschrijven van het niveau van sterfte ligt de nadruk op zuigelingen en kindersterfte, omdat zij worden gezien als de meest bruikbare indicatoren voor het ontwikkelingsniveau van een bevolking. Sterftetafels zoals ontwikkeld bij de Verenigde Naties (1983) worden gebruikt om het niveau en patroon van sterfte te berekenen.

Het model van Bongaarts en Potter (1983) is toegepast om de voor de vruchtbaarheid van belang zijnde variabelen te beschrijven. In hun studie definiëren Bongaarts en Potter (1983, pp. 1-5) factoren welke direct van invloed zijn op de vruchtbaarheid. Het betreft huwelijksleeftijd, gebruik van contraceptiva, abortus provocatus, postpartum onvruchtbaarheid, natuurlijke vruchtbaarheid, miskramen, en het tijdstip waarop de menopauze haar intrede doet. Deze factoren worden beïnvloed door sociaal-economische factoren en de gezondheids- en voedingssituatie van de onderzoekspopulatie (Bongaarts en Potter, 1983, p. 14). Dit onderzoek doet een poging om te beschrijven in welke mate bovenstaande factoren bijdragen aan de vruchtbaarheidsmaten gevonden bij de bevolking van Teminabuan. De vergelijkbaarheid van de onderzoeksgegevens wordt bevorderd door het feit dat de wereldwijd gehouden Demographic and Health Surveys (DHS) ook het model van Bongaarts en Potter gebruiken voor de analyse van vruchtbaarheid alsmede het model van Mosley en Chen voor het beschrijven van sterfte voor het vijfde levensjaar. De Indonesische DHS van 1994 biedt dus een goede bron voor vergelijking.

Migratie (Hoofdstuk 6) wordt bestudeerd met de nadruk op de hedendaagse mobiliteitspatronen in het onderzoeksgebied. Migratiepatronen worden besproken met het oog op de duur en de richting van migratie, alsmede de kenmerken van de migrant. De classificering welke Pryor (1979) heeft gemaakt voor de Indonesische migrant is toegepast op de migranten van Teminabuan. Behalve naar de migratiepatronen is er ook gekeken naar de redenen en consequenties van verhuizen voor migranten welke ten tijde van het onderzoek in het onderdistrict Teminabuan woonden. Migranten die naar buiten het onderzoeksgebied verhuisd zijn, zijn niet opgenomen in deze studie.

Resultaten

1. Bevolkingsopbouw

De bevolking van Teminabuan heeft een leeftijdsopbouw welke kenmerkend is voor een samenleving met een hoge vruchtbaarheid, dat wil zeggen, veel mensen aan de voet en weinig aan de top van de bevolkingspiramide. Op basis van de bevolkingspiramides kan worden afgeleid dat er (nog) geen sprake is van een terugloop in de bevolkingsgroei in Teminabuan, dat Irian Jaya een geringe stagnatie laat zien, en dat Indonesië in zijn geheel een afname in de vruchtbaarheid vertoont. Het percentage van de bevolking dat jonger is dan 15 jaar is 41,8 (Teminabuan survey 1996) vergeleken met 35,0 in Indonesië (CBS *et al.*, 1995).

2. Sterfte

Het sterfteniveau is sterk gerelateerd aan het niveau van de sociaal-economische ontwikkeling van een gebied. Op grond van deze samenhang wordt het sterfteniveau door veel overheden gebruikt als indicator voor plannings-, monitorings-, en evaluatie doeleinden. Hierbij worden zuigelingen- en kindersterfte als de belangrijkste indicatoren gezien. Het niveau van zuigelingensterfte in Teminabuan is 70 per 1000 levend geboren kinderen over de periode 1965-1994. Kindersterfte (<5 jaar) bedraagt 120 per 1000. Concreet betekent dit voor de onderzoeksbevolking van Teminabuan dat van de 205 levend geboren kinderen in 1995, 180 hun vijfde verjaardag ook werkelijk zullen bereiken. Korte geboorte-intervallen (<24

maanden tussen twee opeenvolgende levend geboren kinderen), een relatief hoge leeftijd van de moeder ten tijde van de bevalling (>34 jaar), en een hoge pariteit (>3 kinderen) doen de overlevingskansen van een kind afnemen.

Het sterftepatroon is beschreven naar leeftijd en doodsoorzaak. Sterfte is in Teminabuan in hoge mate geconcentreerd in de jongste leeftijdsgroep (0-5). Infectieziektes zijn onder alle leeftijdsgroepen de voornaamste doodsoorzaak (62,1%), en meer nog onder zuigelingen (72,0%) en kinderen en tieners (72,9%). Gezien het feit dat infectieziekten doodsoorzaak nummer één is, zouden veel sterfgevallen voorkomen kunnen worden. Traditioneel leefde de onderzoekspopulatie een nomadisch bestaan in kleine familie-verbanden verspreid in het oerwoud. Doordat zij nu meer opeen wonen in de dorpen is goede sanitatie van belang bij het voorkomen van parasitaire ziektes. Investeringen op dit gebied, waaronder een verbeterde sanitatie en gezondheidszorg, zou de sterfte beslist doen afnemen. Lokale omstandigheden zoals de slechte bereikbaarheid en de hoge mate van bevolkingsspreiding maken dit echter wel zeer moeilijk en kostbaar.

De levensverwachting, geschat op basis van het niveau van zuigelingensterfte en middels de '*West Model Life table*' van Coale en Demeny, is voor Teminabuan vrijwel gelijk aan die van Indonesië. De levensverwachtingen voor Indonesië liggen alleen ½-2 jaar hoger. De in Teminabuan gevonden waarde van de levensverwachting bij de geboorte is 61,8 jaar voor vrouwen en 57,0 voor mannen.

3. Vruchtbaarheid

Het aantal ooit geboren kinderen (*children ever born* [*CEB*]) naar de leeftijd van de moeder verschaft informatie met betrekking tot het vruchtbaarheidsniveau van een populatie. In vergelijking met de algehele Indonesische bevolking van 1994 heeft een vrouw in Teminabuan (45-49 jaar) gemiddeld een half kind minder aan het einde van haar reproduktieve periode, namelijk 4,46 (*CEB*). De *total fertility rate* (*TFR*) staat voor het gemiddeld aantal kinderen dat een vrouw zou krijgen als zij in leven blijft tot aan het einde van haar vruchtbare periode en kinderen baart met een snelheid gelijk aan de nu bestaande leeftijdsspecifieke vruchtbaarheidscijfers. De *TFR* is de belangrijkste maat van de vruchtbaarheid die we hebben omdat deze maat niet beïnvloed wordt door de leeftijdsopbouw van de bevolking. Is de vruchtbaarheid min of meer stabiel in de tijd, dan resulteert dit erin dat het aantal *CEB* aan het einde van de vruchtbare periode ongeveer gelijk is aan de *TFR*. Met andere woorden, het niveau van vruchtbaarheid voor de cohorten van oudere vrouwen is gelijk aan die voor vrouwen die zich nog in hun vruchtbare periode bevinden. Voor Teminabuan gaat dit inderdaad op ($CEB_{40\text{-}49}$=4,06; *TFR*=3,94). De stabiliteit van de vruchtbaarheid onder de bevolking van Teminabuan kan verklaard worden door het geringe en slechts recente gebruik van moderne contraceptiva, welke ook nog niet altijd succesvol worden toegepast. Traditionele methoden van contraceptie, wat in Teminabuan met name *KB kampung* betreft, worden echter al veel langer gebruikt en men beschouwt ze als zeer betrouwbaar. Verder zijn er ook geen schommelingen geweest in de huwelijksleeftijd.

Zoals eerder gesteld, wordt de vruchtbaarheid direct beïnvloed door factoren welke door Bongaarts en Potter zijn geïdentificeerd. De volgende vier factoren zijn in het model van

Bongaarts en Potter opgenomen: huwelijksleeftijd, gebruik van contraceptiva, abortus provocatus, en postpartum onvruchtbaarheid. Enigszins aangepast aan de lokale omstandigheden van de onderzoekspopulatie levert het model een *TFR* van 3,34 op, wat in de orde van grootte is van de *TFR* berekend op de conventionele manier (3,94). De factoren van het model mogen daarom worden beschouwd als verklarende variabelen van de vruchtbaarheid. Op grond hiervan kunnen ze gebruikt worden om te anticiperen op toekomstige ontwikkelingen in de vruchtbaarheid. De eerste, de huwelijksindex C_m, wat staat voor het percentage gehuwde vrouwen van alle vrouwen in de leeftijd 15-49, is over tijd zeer stabiel gebleken. Hierin wordt in de nabije toekomst geen verandering voorzien (C_m=0,671). Indien alle vruchtbare vrouwen 100 procent betrouwbare anticonceptie middelen zouden gebruiken, zou de index van contraceptie (C_c) nul zijn. De index ligt echter op 0,573 en zal ook nooit de nul benaderen omdat er altijd een aanzienlijke groep vrouwen is die geen contraceptie gebruikt omdat ze zwanger willen worden of zwanger zijn, net bevallen zijn, onvruchtbaar zijn (of hun echtgenoot), of in de menopauze zitten. Wel zou de vruchtbaarheid beïnvloed kunnen worden als degenen die reeds contraceptiva gebruiken meer gebruik gaan maken van middelen met een hogere betrouwbaarheid. In dat geval zou de waarde van C_c afnemen. Wanneer echter succesvolle traditionele middelen van contraceptie vervangen gaan worden door minder succesvolle moderne middelen, dan zal C_c toe gaan nemen. Hoe langer de periode is dat borstvoeding gegeven wordt, hoe meer de index van de postpartum onvruchtbaarheid naar nul zal neigen. In Teminabuan is het zeer gebruikelijk om kinderen lang te zogen (ca. 24 maanden). Het is niet waarschijnlijk dat deze periode in de toekomst nog langer zal worden. De waarde van C_i (0,568) zal daardoor in de toekomst gelijk blijven of eventueel stijgen. Dit laatste kan gebeuren als zuigelingenvoeding, onder meer gunstige economische omstandigheden, op grotere schaal binnen het bereik van de bevolking komt. Het aanbieden van deze zeer voedzame producten kan namelijk leiden tot een afname in de behoefte van het kind om moedermelk te drinken, waardoor de eerste postpartum ovulatie minder lang zal uitblijven. Als dit effect niet gecompenseerd wordt door het gebruik van effectieve voorbehoedmiddelen, zal dit een verhoogde vruchtbaarheid tot gevolg hebben. Met het oog op de nabije toekomst is het daarom, ondanks het feit dat jongere mensen minder kinderen wensen, niet waarschijnlijk dat de vruchtbaarheid ook daadwerkelijk zal afnemen.

In Teminabuan bevallen de meeste vrouwen thuis (86,8%), waarbij ze geholpen worden door een (ongeschoold) familielid (73,9%). Verbeterde omstandigheden rond de bevalling zou de kans van het kind om te overleven zeker doen toenemen, omdat thans een aanzienlijk percentage van de bevallingen een meer dan gemiddeld risico voor het kind (en de moeder) heeft, dan wel door het hoeveelste kind zij zijn (>3; 35,9%), dan wel door de leeftijd van de moeder (>34; 11,8%).

4. Migratie

In Teminabuan vindt migratie voornamelijk plaats over een korte afstand, dat wil zeggen binnen de grenzen van de provincie Irian Jaya. Vroeger waren de belangrijkste redenen om te verhuizen oorlog, *hongi*-tochten, en huwelijk. Nu is migratie in hoofdzaak een gevolg van werk (37,6%), mee verhuizing met het huishouden (bijvoorbeeld wanneer de man elders werk aanvaardt, zal hij gecategoriseerd worden als zijnde 'arbeids-migrant', terwijl zijn eventuele vrouw en kinderen van 18 jaar en ouder mee verhuizen. Of wanneer iemand zijn intrek neemt

bij familie, veelal om in het huishouden te assisteren. Dit is niet als werk-gerelateerde migratie gecategoriseerd omdat het hier onbetaalde arbeid betreft. [25,5%]), opsplitsing van de nederzetting (13,6%), scholing (7,5%), en huwelijk (6,1%). Voor mannen is werk de belangrijkste reden om te verhuizen (52,2%) terwijl vrouwen met name verhuizen als gevolg van het feit dat het hele huishouden zich verplaatst (41,3%).

Bij werk-gerelateerde migratie is de werkgever de belangrijkste factor in het bepalen van de richting van migratie (46%). Andere bronnen van informatie die hieraan richting geven zijn familie en vrienden (24%) en '*job-hunters*'(12%). De media spelen maar een zeer geringe rol (4,1%) in het bepalen van de richting van de aan werk gerelateerde migratie.

De meest voorkomende vorm van migratie in Teminabuan is circulaire migratie. Circulaire migratie betreft veelvuldige maar tijdelijke afwezigheid voor langer dan één dag. Voor de migranten blijft de plaats van herkomst hun vaste woonplaats (*usual place of residence*). Maar liefst 27 procent (n=1400) van de huishoudens circuleren om in hun bestaan te voorzien. Zij gaan met name naar hun (sago-) tuinen. Circulaire migratie is daarnaast ook een vorm van migratie welke veel gebruikt wordt door degenen die producten op de markt willen afzetten. Meer dan vijftig procent van de huishoudens noemt dit als tweede belangrijkste bron van inkomen, al hoeft niet iedereen te circuleren om producten op de markt te verkopen. Circulaire migratie verschaft in feite de mogelijkheid om een stabiel voedsel inkomen, betrokken uit de *subsistence agriculture*, te combineren met een wisselend geldelijk inkomen. Op deze manier komen er toch financiële middelen binnen waarmee goederen gekocht en noodzakelijke betalingen verricht kunnen worden. Circulaire migratie betreft in Teminabuan voornamelijk de inheemse Papoea bevolking.

In de Teminabuan survey is een migrant gedefinieerd als een persoon van 18 jaar en ouder en degene die jonger is maar getrouwd, en ooit verhuisd sinds 1990. Van de doelgroep bleek 14,4 procent (n=3246) migrant. De kenmerken van de migranten zijn vergeleken met de typering zoals opgesteld door Pryor (1979). Vergeleken met Pryor's classificatie zijn de migranten van Teminabuan meer evenredig verdeeld over de beide seksen; er zijn 131 mannen tegen 100 vrouwen (in plaats van voornamelijk mannen). Ook zijn de Teminabuan migranten vaker gehuwd (71,1%) dan alleenstaand. Pryor's bevindingen waren dat de Indonesische migrant minder geschoold was dan de bevolkingsgroep waar hij naar toe verhuisde. In Teminabuan blijkt het tegenovergestelde. Dit is het gevolg van het feit dat een deel van hen speciaal aangetrokken is omwille van hun hogere scholing, zodat zij posten van het lokale bestuur, de gezondheidszorg, en het onderwijs kennen bezetten daar waar onvoldoende geschoolde Papoea's aanwezig zijn. Een ander deel van de beter opgeleide migranten bestaat uit handelaren, met name afkomstig uit Sulawesi, die Teminabuan een geschikte plaats achten om er een zaak te openen. Overeenkomstig Pryor's bevindingen zijn de meeste migranten jong (gemiddeld 30-31 jaar) en komen zij uit een kleiner huishouden dan personen die niet migreerden (resp. 3,5 en 4,6 personen).

Wat zijn (echter) de demografische gevolgen van de migratie zoals aangetroffen in het onderzoeksgebied? Gelet op de sekse distributie blijkt dat deze niet erg beïnvloed wordt daar de meest dominante vorm van migratie welke in Teminabuan voorkomt circulaire migratie

is. Bij 95 procent van deze migratie gaan zowel de vrouw als de man op pad. Verder is er hierbij geen sprake van een permanente verplaatsing en blijft de trek beperkt tot binnen de grenzen van het onderdistrict Teminabuan. Migratie van ongehuwde kinderen, voornamelijk voor studie en werk, wordt gedomineerd door jongens; ongeveer 70 procent (n=322) van deze migranten is van het mannelijke geslacht. Het effect hiervan is het duidelijkst voor de leeftijdsgroep van 20-24 jaar. Deze leeftijdsgroep is kleiner dan de daaropvolgende (25-29) en ook is zij kleiner dan de leeftijdsgroep 20-24 voor vrouwen. Bovendien is de leeftijdsgroep 30-34 voor mannen kleiner dan die voor vrouwen. Echter, daar de betreffende groep klein is en een deel naar Teminabuan terugkeert op het moment dat de opleiding is afgerond of het werk voltooid, is het uiteindelijke effect toch gering.

Demografische veranderingen

De vruchtbaarheid in Teminabuan is stabiel gebleken in de tijd. Voor de nabije toekomst worden ook geen grote veranderingen verwacht. Werk-gerelateerde in- en uit migratie beïnvloedt weliswaar de bevolkingsopbouw, maar dit effect is beperkt. De in- en uit-migranten zijn van dezelfde leeftijd wat het effect op de bevolkingssamenstelling beperkt. Daarnaast gaat het ook maar om een relatief kleine groep. Het uiteindelijke effect zou kunnen zijn dat de leeftijdsgroep 25-39 iets groter is. Kleine inkepingen in de bevolkingspiramide voor leeftijd 15-19 (vrouwen) en 20-24 (mannen) zijn waarschijnlijk het resultaat van (tijdelijke) verhuizingen in het kader van scholing. Als een groter aandeel van de kinderen naar het middelbaar en hoger onderwijs zou gaan, zouden deze inkepingen significanter worden. Zo'n ontwikkeling is echter niet voorzien.
Het patroon van sterfte wordt gekenmerkt door relatief veel sterfgevallen in de jongste leeftijdsgroepen. De hierboven beschreven patronen van vruchtbaarheid, migratie, en sterfte maken dat de vorm van bevolkingspiramide voorlopig blijft zoals hij is: een brede basis en een smalle top. Wanneer de sterfte af zou nemen, bijvoorbeeld doordat infectieuze en parasitaire ziektes minder slachtoffers zouden maken, zal dit als gevolg hebben dat de mate van bevolkingsreductie bij toenemende leeftijd langzamer wordt.

Om te kunnen beoordelen of de demografische transitie al in gang gezet is in Teminabuan, moeten we kijken naar het patroon van vruchtbaarheid en sterfte in de tijd. Het transitie model gaat ervan uit dat de vruchtbaarheid en sterfte hoog en fluctuerend zijn voordat de demografische transitie begint. De transitie begint met een daling van de sterfte, waarna de vruchtbaarheid langzaam volgt. Van de analyse van sterfte hebben we kunnen concluderen dat deze inderdaad aan het teruglopen is, en wel onder alle leeftijdsgroepen. Daarbij zijn epidemieën in aantal en omvang afgenomen. Wat de vruchtbaarheid betreft zijn er voorlopig weinig aanwijzingen dat die aan het verminderen is. Dit wordt geconcludeerd uit het feit dat het aantal ooit-geboren kinderen aan het einde van de vruchtbare periode min of meer gelijk is aan de tegenwoordige *TFR*. We kunnen daarom concluderen dat Teminabuan zich aan het begin van de demografische transitie bevindt.

Ringkasan

Penelitian survei demografi di Irian Jaya. Dinamika penduduk Teminabuan, Semenanjung Doberai, Irian jaya, Indonesia.

Pendahuluan

Terletak di propinsi yang paling timur di Indonesia,Teminabuan merupakan tempat yang sangat kecil di kepulauan Indonesia. Kehidupan di sana pada saat ini, sebagian besar, tidak banyak berubah seperti yang pernah ditulis oleh para pejabat pemerintahan Belanda puluhan tahun yang lalu. Daerah ini dicirikan oleh banyaknya tanaman sagu di tanah yang berpaya (berlumpur), hutan tropis, sungai-sungai yang kecil, jalan-jalan sempit untuk pejalan kaki dan tempat-tempat kediaman yang kecil dan tersebar.

Pekerjaan sehari-hari bagi kebanyakan penduduknya adalah bercocok-tanam untuk kebutuhan sendiri. Jika hasilnya berlebihan, mereka akan menjualnya untuk dapat membeli gula, teh, kopi, minyak tanah, pakaian dan untuk membayar uang sekolah, atau sumbangan untuk gereja.

Kehidupan sosialnya kebanyakan diorganisasi di sekitar gereja Protestan. Upacara pembaptisan telah berlangsung sejak awal pertengahan abad dua puluh ini dan telah menjadi tradisi bagi masyarakat Papua. Selama hari-hari kerja (Senin sampai Jumat) mereka terbiasa bekerja dan tinggal di ladang. Sementara, pada hari Sabtu, mereka berangkat menuju desa untuk dapat mengikuti upacara gereja pada hari Minggunya, dan esok harinya mereka pergi kembali ke ladangnya masing-masing. Penduduk desa biasanya mengadakan pertemuan keagamaan pada Minggu siang tersebut. Sementara itu ada pula kelompok penduduk lain yang tinggal di desa, seperti orang-orang Islam, yang kebanyakan merupakan pendatang dari pulau lainnya dan mempunyai latar belakang sosial-ekonomi yang berbeda sekali. Kaum pendatang ini biasanya tinggal di daerah administrasi dari kecamatan dan memiliki pekerjaan terdidik.

Penelitian demografi dalam buku ini merupakan bagian dari program penelitian inter-disiplin yang dilakukan di Semenanjung Doberai. Penelitian ini merupakan kombinasi dari beberapa penelitian seperti: antropologi, arkeologi, ilmu kepemerintahan, demografi, etno-botani, geologi dan linguistik. Kecamatan Teminabuan yang terletak di daerah barat-daya Semenanjung Doberai terpilih sebagai tempat untuk penelitian di bidang arkeologi, ilmu kepemerintahan dan demografi. Dasar dari pemilihan ini adalah kenyataan bahwa thema dari ilmu sosial didefinisikan sebagai: 'perpindahan dari objek, manusia, ketergantungan dan ide'. Berdasarkan laporan-laporan dari pejabat pemerintah setempat, Teminabuan merupakan tempat yang tepat untuk penelitian tentang perpindahan-perpindahan tersebut di atas.

Tujuan

Ada empat pertanyaan penting untuk penelitian demografi ini, yaitu:

1. *Bagaimana tingkat kesuburan dan kematian serta pola perpindahan dari penduduk di daerah barat-daya Semenanjung Doberai di Irian Jaya?*

2. *Apa pengaruh dari kematian, kesuburan dan perpindahan terhadap komposisi dari penduduk?*

3. *Bagaimana hubungan karakteristik demografi di Semenanjung Doberai dengan karakteristik demografi di Indonesia dan di Papua Nugini?*

4. *Cara apa yang paling efektif untuk mengumpulkan data dalam jumlah yang besar mengenai demografi dan kesehatan di tempat yang sangat tertutup dan yang mana mobilitas penduduknya yang sangat tinggi?*

Selain itu juga diteliti bagaimana cara terbaik untuk bertukar informasi dengan penelitian yang dilakukan di bidang antropologi dan ilmu kepemerintahan.

Wilayah dan penduduk penelitian

Kecamatan Teminabuan terletak di sebelah barat-daya Semenanjung Doberai, di ujung Teluk Kaibus, dengan cabangnya yang banyak menyebabkan pasang di tempat yang cukup luas. Cabang-cabang ini dan cabang lainnya di sekitar sungai-sungai merupakan tempat yang paling penting untuk transportasi, selain menggunakan jalan kecil bagi pejalan kaki. Sampan-sampan disana biasanya terbuat dari kayu pohon yang dilubangi.

Di pantai selatan terdapat banyak tanaman sagu yang tumbuh di tanah berpaya. Semakin ke arah utara maka tanah tersebut akan berubah menjadi tanah kapur yang agak berbukit-bukit. Karena tanah liat sukar untuk ditembus air, maka pembentukan tanah yang berpaya-paya menjadi lebih cepat. Oleh sebab itu kebanyakan tanah di daerah tersebut tidak cocok untuk pertanian. Hanya tanaman sagu saja yang dapat dihasilkan, sehingga sagu merupakan makanan utama bagi kebanyakan penduduk. Ladang-ladang sagu tersebut berbatasan dengan hutan tropis. Iklim disana ditandai dengan temperatur yang tinggi (tidak pernah dibawah 18°C) dan tidak adanya musim kering.

Penduduk Teminabuan tinggal di desa-desa kecil yang tersebar luas dengan rata-rata jumlah penduduk sekitar 300 orang. Kebanyakan dari desa-desa tersebut merupakan kesatuan administrasi daripada yang dikatakan desa sebenarnya. Kenyataannya banyak dari penduduk desa selama hari-hari kerja (Senin sampai Jumat) tinggal dan bekerja di ladangnya yang tersebar di sekitar desanya. Jaraknya dapat dikatakan sangat jauh sekali,

dan jarak tersebut dihitung dalam satuan waktu yang dibutuhkan untuk mencapai tempat tujuannya. Penduduk disana terbiasa hidup di dalam kelompok kecil.

Satu keluarga rata-rata terdiri atas 4,4 orang. Sekitar 30% tinggal beberapa keluarga dalam satu rumah di desa yang sama. Karena banyak keluarga pada siang hari atau kadang-kadang beberapa hari bekerja di ladangnya atau memancing ikan, maka kerapatan penduduknya menjadi lebih kecil jika dibandingkan dengan angka-angka yang tercatat.

Penduduk yang berpendidikan rendah biasanya hidup di lingkungan yang sangat sederhana. Rumah mereka dibangun dari material yang didapat sekitarnya, dan mereka hidup dari apa yang diberikan oleh tanah dan air kepada mereka. Selebihnya, keperluan-keperluan yang mewah seperti kopi, teh, gula dan pakaian dapat dibeli jika ladang atau perikanannya memberikan hasil yang berlebihan sehingga sebagiannya dapat dijual. Sementara itu, sebagian besar pendatang yang rata-rata berpendidikan lebih tinggi, tinggal di pusat administrasi dari kecamatan. Kepala keluarganya biasanya mempunyai hubungan kerja di pemerintah lokal, di bidang kesehatan dan pendidikan atau mempunyai toko.

Adanya perbedaan antara penduduk setempat dengan pendatang menyebabkan secara langsung perbedaan-perbedaan di bidang etnis (antara orang Papua dan orang Makasar, Ambon, Jawa dan yang lainnya), di bidang agama (antara Kristen dan Islam) dan di bidang bahasa (bahasa Tehit dan bahasa dari pulau lainnya, dan kemampuan berbahasa Indonesia yang baik dari kaum pendatangnya). Perbedaan yang sangat besar ini menyebabkan masyarakatnya peka terhadap kerusuhan sosial, seperti demonstrasi yang terjadi di Ambon dan Kalimantan.

Metodologi penelitian

Informasi terkini secara kuantitatif dan kualitatif sangat dibutuhkan untuk dapat menjawab pertanyaan yang telah tersebut di atas. Melalui penelitian survei (Mei-September 1996) dikumpulkan data kuantitatif. Data tersebut dilengkapi dan sebagian diperoleh dari data kualitatif yang didapat dari wawancara dengan 'key-informants' (team survei, penduduk desa dan pejabat pemerintah setempat) tentang beberapa subjek. Semua ini dilengkapi dengan studi literatur dari sumber-sumber data sekunder yang berkaitan. Penelitian di lapangan dilakukan dengan cara survei penduduk terhadap 1400 keluarga (sekitar 6200 orang). Dengan cara ini diperoleh dasar yang cukup untuk keperluan analisa demografi. Survei ini dilakukan dalam 20 dari 30 desa yang terdapat di kecamatan Teminabuan.

Angka kesuburan dan kematian serta perpindahan penduduk dipelajari dari pertumbuhan dan pengurangan penduduk, menurut umur dan jenis kelamin, yang menentukan komposisi penduduknya. Penelitian populasi juga diikutsertakan dalam penganalisaan. Angka kematian (Bab 4) dan angka kesuburan (Bab 5) dan variabel yang mempengaruhinya, dipelajari dengan menggunakan model dari Mosley dan Chen (1984) dan model dari Bongaarts dan Potter (1983).

Model Mosley dan Chen (1984) digunakan untuk menganalisa latar belakang dari kematian. Model tersebut berisi sebuah daftar faktor-faktor sosial-ekonomi yang langsung berhubungan dengan kematian sebelum mencapai umur lima tahun. Kematian bayi dan anak kecil sangat ditekankan dalam menguraikan tingkat kematian, karena mereka dianggap sebagai indikator yang paling banyak digunakan dalam tingkat perkembangan penduduk. Statistik kematian seperti yang dikembangkan oleh negara Amerika Serikat digunakan untuk menghitung tingkat dan pola dari kematian.

Model dari Bongaarts dan Potter (1983) digunakan untuk menguraikan variabel-variabel yang penting dalam kesuburan. Dalam studinya, Bongaarts dan Potter (1983, hal. 1-5) mendefinisikan faktor-faktor yang mempengaruhi langsung pada kesuburan. Antara lain: umur pernikahan, penggunaan kontrasepsi, pengguguran bayi, ketidaksuburan postpartum, kesuburan alamiah, keguguran dan waktu mulainya menopause. Faktor-faktor ini dipengaruhi oleh faktor sosial-ekonomi, kesehatan dan keadaan makanan dari populasi yang diteliti (Bongaarts dan Potter, 1983, hal. 14).

Penelitian ini mencoba untuk menguraikan seberapa jauh faktor-faktor tersebut di atas mempengaruhi ukuran kesuburan dari penduduk di Teminabuan. Hasil penelitian dapat dibandingkan dengan hasil penelitian dari DHS (Demographic and Health Surveys) yang dilakukan di seluruh dunia. Model dari Bongaarts dan Potter digunakan untuk memganalisa kesuburan, sedangkan model dari Mosley dan Chen digunakan untuk menjelaskan kematian sebelum umur lima tahun. DHS di Indonesia pada tahun 1994 dapat dijadikan sumber yang baik untuk perbandingan.

Perpindahan penduduk (Bab 6) dipelajari dengan penekanan pada pola mobilitas di daerah penelitian pada saat ini. Pola perpindahan dibicarakan untuk melihat lama dan arah dari perpindahan yang merupakan ciri-ciri dari perpindahan.

Klasifikasi yang dibuat oleh Pryor (1979) mengenai perpindahan di Indonesia digunakan dalam perpindahan di Teminabuan. Selain dilihat dari pola perpindahan, juga diteliti alasan dan konsekwensi dari perpindahan penduduk yang terjadi selama penelitian di kecamatan Teminabuan. Penduduk yang berpindah tempat ke luar daerah penelitian tidak diikutsertakan dalam analisa penelitian ini.

Hasil penelitian

1. Komposisi penduduk

Penduduk Teminabuan mempunyai komposisi umur yang khas untuk masyarakat dengan angka kesuburan yang tinggi. Artinya banyak penduduk dikategorikan di bagian bawah piramida penduduk dan sedikit di bagian atas piramida penduduk. Berdasarkan piramida penduduk dapat dikatakan bahwa pertumbuhan penduduk di Teminabuan meningkat. Sementara itu, Irian Jaya menunjukkan penghentian pertumbuhan penduduk yang sedikit sekali. Sedangkan di Indonesia secara keseluruhan menunjukkan penurunan angka

kesuburan. Persentase dari penduduk yang lebih muda dari 15 tahun adalah 41,8 (survei Teminabuan 1996) dibandingkan dengan 35 di Indonesia (CBS dkk, 1995).

2. Angka kematian

Tingkat kematian berhubungan erat sekali dengan tingkat perkembangan sosial-ekonomi dari suatu daerah. Berdasarkan hubungan ini maka tingkat kematian dijadikan sebagai indikator untuk tujuan perencanaan, pengontrolan dan evaluasi. Dalam hal ini kematian bayi dan balita (bawah 5 tahun) diangggap sebagai indikator yang paling penting.

Tingkat kematian bayi di Teminabuan adalah 70 per 1000 bayi yang dilahirkan hidup dalam periode 1965-1994. Angka kematian balita adalah 120 per 1000. Secara nyata hal ini berarti dalam penelitian penduduk Teminabuan bahwa dari 205 bayi yang dilahirkan hidup pada tahun 1995, 180 dari bayi tersebut mencapai umur 5 tahun.

Jarak antara kelahiran yang pendek (< 24 bulan antara dua kelahiran bayi hidup berturut-turut), umur ibu yang relatif tinggi pada saat melahirkan (>34 tahun) dan tingginya jumlah anak yang pernah dilahirkan (Children Ever Born >3 anak) menyebabkan kesempatan hidup dari anak menurun.

Pola kematian diuraikan berdasarkan umur dan penyebab kematian. Kematian di Teminabuan kebanyakan terpusat di kelompok umur termuda (0-5). Penyakit infeksi merupakan penyebab kematian yang tertinggi disemua kelompok umur (62,1%), lebih tinggi lagi di kelompok bayi (72,0%) dan di kelompok balita dan anak belasan tahun (72,9%).

Melihat kenyataan bahwa penyakit infeksi merupakan penyebab kematian utama, maka kematian penduduk sebenarnya dapat dicegah. Populasi penelitian disini pada zaman dahulunya hidup secara tradisional, nomaden dalam lingkungan keluarga kecil yang tersebar di hutan. Mereka saat ini hidup di desa-desa, sanitasi yang baik sangatlah penting untuk mencegah penyakit-penyakit parasit. Investasi di bidang kesehatan di daerah ini, seperti perbaikan sanitasi dan kesehatan, pasti akan menurunkan angka kematian. Keadaan geografi setempat seperti sulitnya untuk dicapai dan tingginya angka penyebaran penduduk menjadikan hal ini sangat sulit dan mahal sekali.

Angka harapan hidup di Teminabuan yang diperkirakan dari tingkat kematian bayi dan juga menggunakan tabel 'West Model life Table'dari Coale dan Demeny, adalah hampir sama dengan di Indonesia. Angka harapan hidup di Indonesia hanya ½ -2 tahun lebih tinggi. Angka harapan hidup di Teminabuan pada saat kelahiran adalah 61,8 tahun untuk wanita dan 57,0 tahun untuk pria.

3. Angka kesuburan

Jumlah anak yang pernah dilahirkan (Children Ever Born=CEB) berdasarkan usia ibu memberikan informasi yang berhubungan dengan tingkat kesuburan dari suatu populasi. Apabila dibandingkan dengan keseluruhan penduduk Indonesia pada tahun 1994, maka

wanita di Teminabuan (usia 45-49 tahun) secara rata-rata mempunyai setengah anak lebih sedikit pada akhir masa reproduktifnya, yaitu 4,46 (CEB).

Angka kesuburan total (Total Fertility Rate=TFR) adalah jumlah rata-rata anak yang dapat dilahirkan oleh seorang wanita jika ia hidup sampai akhir masa kesuburannya dan melahirkan anak dengan kecepatan yang sama dengan angka kesuburan berdasarkan umur tertentu yang terdapat sekarang. TFR adalah ukuran terpenting dari kesuburan yang kita punyai, sebab ukuran ini tidak dipengaruhi oleh komposisi umur dari penduduknya. Jika angka kesuburan stabil dari waktu ke waktu maka hal ini akan memperlihatkan jumlah CEB pada akhir masa kesuburan kurang lebih sama dengan TFR. Dengan kata lain, tingkat kesuburan dari sebagian besar wanita yang berusia tua sama dengan dari wanita yang masih hidup dalam masa suburnya. Hal seperti ini terjadi di Teminabuan (CEB_{40-49}=4,06; TFR=3,94). Kestabilan angka kesuburan dalam masyarakat Teminabuan dapat diterangkan dengan sedikitnya penggunaan kontrasepsi modern, yang juga belum digunakan dengan baik sampai sekarang. Metode kontrasepsi tradisional, yang disebut *KB (Keluarga Berencana) kampung*, telah lama digunakan dan orang menganggapnya bahwa cara itu sangat terpercaya. Selain itu tidak ada perubahan dalam usia pernikahan.

Seperti yang telah disebutkan sebelumnya, angka kesuburan dipengaruhi oleh faktor-faktor yang telah diidentifikasikan oleh Bongaarts dan Potter. Faktor-faktor tersebut adalah: umur pernikahan, penggunaan kontrasepsi, pengguguran bayi dan ketidaksuburan postpartum. Disesuaikan sedikit dengan keadaan setempat dari populasi penelitian maka model Bongaarts dan Potter menghasilkan TFR sebesar 3,34, hampir sama dengan TFR yang dihitung dengan cara konvensional (3,94). Karena itu faktor-faktor dari model tersebut dapat dianggap variabel yang menyatakan angka kesuburan. Dengan dasar ini maka faktor-faktor tersebut dapat digunakan untuk mengantisipasi perkembangan angka kesuburan di masa yang akan datang.

Yang pertama, indeks pernikahan C_m, yang menyatakan persentase wanita yang menikah dari semua wanita yang berumur 15-49 tahun, terlihat sangat stabil dari waktu ke waktu. Dengan demikian diharapkan tidak akan ada perubahan di masa yang akan datang (C_m=0,671). Jika semua wanita subur 100% menggunakan kontrasepsi yang terpercaya, maka indeks kontrasepsinya (C_c) akan menjadi nol. Kenyataannya indeks tersebut adalah 0,573 dan tidak akan pernah mencapai nol. Hal ini disebabkan karena ada sekelompok besar wanita yang tidak mau menggunakan kontrasepsi dengan alasan bahwa mereka ingin hamil atau sedang hamil, baru saja melahirkan, tidak subur lagi (atau suaminya) atau mereka sudah mendapatkan menopause.

Angka kesuburan tersebut dapat dipengaruhi, jika orang-orang yang telah menggunakan kontrasepsi mau menggunakan kontrasepsi yang lebih terpercaya. Dalam keadaan itu maka nilai dari C_c akan menurun. Jika kontrasepsi tradisional yang terpercaya diganti dengan kontrasepsi modern yang kurang terpercaya, maka C_c akan meningkat.

Makin lama masa menyusui, indeks ketidaksuburan postpartum akan cenderung mendekati nol. Bayi-bayi di Teminabuan mempunyai kebiasaan untuk menyusui dalam jangka waktu

yang lama (sekitar 24 bulan). Periode ini kemungkinan tidak akan menjadi lebih lama di masa yang akan datang. Karena itu nilai C, (0,568) akan stabil atau mungkin meningkat di masa yang akan datang. Yang terakhir ini akan terjadi jika makanan bayi, dalam keadaan ekonomi yang baik, dalam jumlah yang besar dapat mencapai penduduk disana.

Adanya produk-produk yang bergizi tinggi akan menyebabkan penurunan dalam kebutuhan bayi untuk menyusui, karena itu ovulasi pospartum akan menjadi lebih cepat. Jika efek ini tidak dikompensasi oleh penggunaan kontrasepsi yang efektif, maka akan menyebabkan peningkatan angka kesuburan. Karena itu dalam waktu dekat dapat terlihat, walaupun kaum mudanya menghendaki jumlah anak yang lebih sedikit, bahwa angka kesuburan tidaklah mungkin segera akan menurun.

Kebanyakan wanita di Teminabuan melahirkan di rumah (86,8%). Mereka dibantu oleh anggota keluarga yang tidak terdidik (73,9%). Perbaikan keadaan disekitar kelahiran akan memperbesar kemungkinan hidup dari bayinya. Pada saat ini persentase kelahiran yang tinggi memberikan risiko yang besar bagi anak dan ibunya. Hal ini disebabkan karena anak yang dilahirkan adalah anak yang kesekian kalinya (>3; 35,9%) atau usia ibunya (>34; 11,8%).

4. Perpindahan penduduk

Perpindahan penduduk di Teminabuan terjadi kebanyakan dalam jarak yang pendek, artinya masih dalam batas propinsi Irian Jaya. Perang, perjalanan-*Hongi* dan perkawinan merupakan alasan utama untuk berpindah tempat di zaman dahulu kala. Pada saat ini, migrasi kebanyakan disebabkan oleh alasan pekerjaan (37,6%), ikut berpindah dengan seluruh keluarga (contohnya, jika kepala keluarga mendapat pekerjaan di tempat lain, maka hanya dia yang akan digolongkan sebagai 'pekerja-migran', padahal ada kemungkinan isteri dan anak-anaknya yang berumur 18 tahun atau lebih juga ikut berpindah. Atau jika seseorang ikut tinggal bersama sanak familinya, yang kebanyakan untuk membantu rumah tangga. Hal ini tidak digolongkan sebagai migrasi yang berhubungan dengan kerja, karena pekerjaan seperti itu adalah pekerjaan yang tidak dibayar. [25,5%]), pembagian tempat kediaman, (13,6%),sekolah (7,5%) dan pernikahan (6,1%). Pekerjaan merupakan alasan utama bagi perpindahan kaum lelaki (52,2%), sedangkan kaum wanita ikut berpindah karena seluruh keluarga ikut berpindah tempat (41,3%).

Tempat bekerja merupakan faktor yang paling menentukan arah migrasi (46%) dalam migrasi yang berhubungan dengan pekerjaan. Faktor lainnya yang menentukan arah ini adalah: sanak famili dan teman (24%) dan 'job-hunters'(12%). Media berperanan sedikit sekali (4,1%) dalam menentukan arah migrasi yang berhubungan dengan pekerjaan.

Bentuk migrasi yang paling banyak dijumpai di Teminabuan adalah migrasi sirkuler. Hal ini menyangkut ketidakhadiran sementara dari kebanyakan orang dalam periode yang lebih lama dari satu hari. Tempat asal merupakan tempat menetap (usual place of residence) bagi migran tersebut. Hanya 27% (n=1400) dari semua keluarga yang diteliti, bermigrasi

sirkuler untuk memenuhi kebutuhan hidup mereka. Kebanyakan dari mereka pergi menuju ladang-ladang sagu.

Selain itu migrasi sirkuler ini juga merupakan sebuah bentuk migrasi yang digunakan oleh orang-orang yang hendak menjual produknya di pasar. Lebih dari 50% dari semua keluarga yang diteliti mengatakan hal ini sebagai sumber kedua yang paling penting dari pemasukan uang, walaupun tidak semua orang bersirkuler untuk menjual produk di pasar. Migrasi sirkuler ini dalam kenyataannya memberikan kemungkinan untuk pemasukan makanan yang stabil, tidak hanya dari 'subsistence agriculture' tetapi juga dikombinasi dengan pemasukan lainnya. Cara ini memberikan pemasukan uang yang mana dapat dipakai untuk membeli barang dan membayar hal-hal yang penting. Migrasi sirkuler di Teminabuan ini menyangkut terutama penduduk pribumi Papua.

Dalam survei di Teminabuan, migran didefinisikan sebagai seseorang yang berumur 18 tahun atau lebih, atau lebih muda tetapi sudah menikah, dan pernah berpindah tempat sejak 1990. Dari kelompok target ternyata 14,4% (n=3246) adalah migran. Ciri khas dari para migran dibandingkan dengan gambaran yang telah dibuat oleh Pryor (1979).

Dibandingkan dengan klasifikasi dari Pryor, para migran di Teminabuan lebih terbagi rata dalam dua jenis kelamin, yaitu 131 lelaki dibanding dengan 100 wanita. Para migran di Teminabuan juga kebanyakan sudah menikah (71,1%). Penemuan Pryor menyatakan bahwa migran di Indonesia biasanya mempunyai pendidikan yang lebih rendah dari kelompok penduduk di tempat yang dituju untuk perpindahan. Di Teminabuan ternyata sebaliknya. Ini adalah akibat dari kenyataan bahwa sebagian dari mereka yang bersekolah tinggi tertarik untuk menduduki pos-pos di pemerintahan setempat, di bidang kesehatan dan pendidikan. Yang mana di tempat tersebut kekurangan orang Papua yang berpendidikan tinggi. Sebagian lain dari migran yang berpendidikan lebih tinggi terdiri atas para pedagang, kebanyakan datang dari Sulawesi, mereka berusaha mencari tempat yang baik untuk berdagang.

Persamaan dengan penemuan dari Pryor adalah bahwa kebanyakan migran relatif berusia muda (30-31 tahun) dan datang dari keluarga yang lebih kecil dari orang-orang yang tidak berpindah tempat (berturut-turut 3,5 dan 4,6 orang).

Apa sebenarnya akibat karakteristik demografi dari migrasi yang ditemukan di daerah penelitian ini? Karena migrasi yang paling dominan di Teminabuan adalah migrasi sirkuler maka penyebaran jenis kelamin tidak mempengaruhi hal ini. Dalam 95% dari jenis migrasi ini, baik pria maupun wanita sama-sama bersirkuler.

Selanjutnya dalam hal ini bisa dikatakan bahwa tidak ada migrasi yang permanen dan migrasi pun terjadi dalam batas kecamatan Teminabuan. Migrasi dari anak-anak yang belum menikah, untuk tujuan sekolah dan kerja, didominasi oleh kaum pria, sekitar 70% (n=322). Efek ini terlihat jelas sekali pada kelompok umur 20-24 tahun. Kelompok umur ini lebih kecil dari kelompok umur 25-29 tahun dan kelompok umur 20-24 tahun dari kaum wanita. Selain itu kelompok umur 30-34 tahun dari kaum pria lebih kecil dari kaum

wanitanya. Kelompok yang bersangkutan memang kecil karena kemungkinan orang untuk kembali ke Teminabuan pada saat pendidikan atau pekerjaan mereka selesai adalah sangat kecil.

Perubahan-perubahan demografi

Angka kesuburan di Teminabuan terlihat stabil dari waktu ke waktu. Tak ada perubahan yang diharapkan dalam waktu mendekat ini. Migrasi yang berhubungan dengan pekerjaan memang dipengaruhi oleh komposisi penduduk, namun efek ini terbatas. Baik migrant yang masuk maupun yang keluar terdiri dari kelompok umur yang sama, sehingga efek dalam komposisi kependudukannya sangat terbatas. Selain itu migran ini menyangkut kelompok yang relatif kecil. Efek yang dapat terlihat mungkin adalah meningkatnya kelompok umur 25-39 tahun.

Fluktuasi yang tajam dalam piramida kependudukan pada kelompok umur 15-19 tahun (wanita) dan 20-24 tahun (pria) kemungkinan hasil sementara dari perpindahan untuk keperluan sekolah. Jika andil dari anak-anak yang pergi ke sekolah menengah dan perguruan tinggi meningkat, maka fluktuasi yang tajam akan semakin terlibat. Namun demikian perkembangan seperti ini tidak akan terjadi.

Pola dari kematian ditandai dengan angka kematian yang relatif tinggi pada kelompok umur termuda. Pola-pola dari kesuburan, migrasi dan kematian yang diuraikan di atas tadi menjadikan bentuk piramida penduduk yang sementara tidak berubah, yaitu dasar yang luas dengan puncak yang sempit. Jika angka kematian menurun, sebagai contoh karena penyakit-penyakit infeksi dan parasit berkurang, maka akan mengakibatkan ukuran dari pengurangan penduduk pada usia yang lebih tua menjadi lebih lambat.

Untuk dapat mengevaluasi apakah transisi demografi telah terjadi di Teminabuan, kita harus melihat pada pola kesuburan dan kematian dalam waktunya. Model transisi menyatakan bahwa angka kesuburan dan kematian akan menjadi tinggi dan berfluktuasi sebelum transisi demografi terjadi. Transisi dimulai dari penurunan angka kematian, setelah itu angka kesuburan mengikuti dengan lambat.

Dari analisa angka kematian kami dapat menyimpulkan bahwa angka tersebut mulai menurun disemua kelompok umur. Epidemi pun berkurang dalam jumlah dan luasnya. Dalam hal kesuburan, sementara ini tidak terlihat perubahan yang menurun. Ini disimpulkan dari kenyataan bahwa jumlah anak yang pernah dilahirkan pada akhir masa subur kurang lebih sama dengan nilai TFR. Dengan demikian kami menyimpulkan bahwa Teminabuan berada dalam tahap pertama dari transisi demografi.

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NETHUR-DEMOGRAPHY, incorporated in the Netherlands Graduate School of Housing and Urban Research (NETHUR), is carrying on the Ph.D. course programme of the former Netherlands Graduate School of Research in Demography (PDOD).

Birth, death, and relocation are major life events. Whether in modern Western Europe or in the traditional society of the Teminabuan population (a rural society in Irian Jaya, Indonesia), these events constitute three milestones in a lifetime. Choosing a partner and (generally) opting for parenthood, the desire to protect children and other close relatives from illness and death, as well as decisions involving relocation and the adjustments such a move requires, are events we all face in life. How we deal with these 'challenges' is determined by the characteristics of the society in which we live, the prevailing norms and attitudes. The specific combination of these factors, together with the people's own free-will, influence the final (birth, death, migration) outcome. The understanding of demographic features such as fertility, mortality, and migration therefore entails more than simply quoting statistics. It requires a study of the background variables. This study presents the figures as well as the direct and indirect determinants of fertility, mortality, and migration, as found in the present-day Teminabuan subdistrict, a previously uncharted area. This data demonstrates how the study population deals with their challenges in life.

Hendrika Lautenbach graduated in non-western demography (University of Groningen). The present research was carried out while she was working in the programme 'Irian Jaya Studies, a programme for Interdisciplinary Research' (ISIR) which is based in Leiden. During the research she was posted at the Population Research Centre of the University of Groningen. Next, Lautenbach will be working at the Central Bureau of Statistics Netherlands in Heerlen.

ISBN 90-5538-040-7

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