Factors underpinning fertility decline in North Sumatra, 1980-1990

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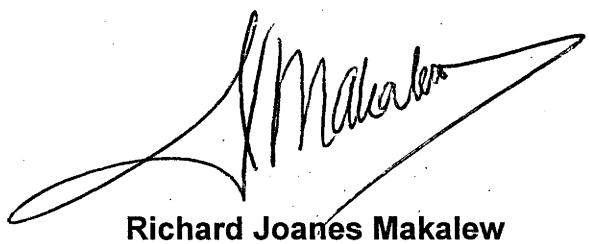

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Abstract

This thesis attempts to explain factors underpinning fertility decline in North Sumatra. Particular emphasis is given to the period between 1980 and 1990 by using information available from the 1980 and 1990 Censuses. As a province with a heterogeneous population, ethnicity is a major focus. The thesis also examines the effects of education and economic development in relation to the decline.

The fertility level in North Sumatra was very high in the past, but it began to decline in the late 1970s although it was believed unlikely to decline because most indigenous ethnic groups in North Sumatra preferred large families. Unlike in Java or other parts of Indonesia, people in North Sumatra did, not easily accept government programs such as family planning.

The evolution from high to low fertility found in North Sumatra differs from the experience in the European countries because it occurred: (1) at a relatively low level of socio-economic development; (2) in a relatively short period; (3) in an environment where modern contraception is readily available; (4) in a society where the family system is stronger, and in some ethnic groups, such as the Christian and Muslim Bataks, intergenerational obligations are greater; (5) where the status of women is low; (6) where primary education is widespread; (7) in a less urbanised society but one with greater exposure to the world economic system; (8) with better communication and transportation facilities; (9) with a lower level of infant mortality at the onset of fertility decline; and (10) where marriage is universal. In addition, pre-transition fertility rates were lower than the case in Europe and out-migration is negligible. Most of these findings confirm the differences between the Asian and European fertility transitions indicated by McDonald (1993).

The variation of fertility levels measured by total fertility rates by ethnic groups in 1980 indicated that the levels had started to decline before 1980. The Chinese ethnic group then had the lowest level of fertility, similar to the levels for Chinese in Malaysia. However, the levels of all other ethnic groups were still very high. By 1990, the levels had declined substantially across all ethnic groups. The Javanese ethnic group experienced the largest decline followed by the Christian Batak, the Malays, Islam Batak and the Chinese.

Coale indices are used in this thesis to determine the immediate factors underpinning fertility decline. In general, factors related to fertility decline in North Sumatra vary by ethnic group. The decline among the Javanese and Christian Batak are more related to the increase of age at first marriage than to the use of contraception, while all other ethnic groups was equally influenced by both factors. Educational levels found a substantial variation of fertility decline. The Javanese with primary education experienced the largest decline compared to the other ethnic groups, while for those with secondary education

the Christian Batak ethnic group had the largest decline between 1980 and 1990. The decline among the Javanese followed by Christian Batak and the Malays with primary education was more related to the use of contraception. This also applied to those with secondary education with the exception that the Javanese with secondary education were more influenced by the increase of age at first marriage. This study does not find a strong relationship between fertility decline and economic development in North Sumatra. Rather the pattern of fertility decline varied mainly in relation to ethnicity. In turn, variations by ethnicity were attributed to the unique set of circumstances, which arises when a particular traditional culture comes in contact with more universal modernisation factors.

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CHAPTER 1

INTRODUCTION

1.1. Background

The evolution from high to low fertility, as part of the demographic transition process, has been completed in Western Europe and other developed countries. In the past two to three decades, this process has been also occurring in developing countries, especially Asian countries, and at a faster pace (Freedman, 1995). Unlike mortality decline, fertility decline has drawn the attention of many authors because of its unique and unprecedented pace, especially Asia.

For comparison with the Asian fertility transition, detailed reviews have been made of the causes of the fertility transition in Europe. Indeed, the European transition inspired the demographic transition theory, especially in Asia (Thompson, 1929; Davis, 1945; Notestein, 1953). This theory has been revisited as part of the European Fertility Project (Coale and Watkins, 1986a). The findings of this project have given detailed insights into the decline and some postulations of demographic transition theory have been reviewed (Coale, 1973a; 1979; Coale and Watkins, 1986a).

Freedman (1995) has shown that fertility in Asian countries has declined quite rapidly compared to the experience of Western Europe or other developed countries. However, the settings in which the decline is taking place are

considerably different from the settings in which fertility declined in the Western Europe countries (McDonald, 1993 : 12-13). More empirical evidence of the fertility decline in Asia is needed but it is clear that this is occurring in a different cultural, educational, and economic environment.

Cultural similarity is one of the conditional factors that explain fertility decline in Europe. Homogeneity of culture has been related to the decline of fertility (see McDonald, 1993 : 7); this is also supported in the experience of fertility decline in Asia. The decline in the Asian countries was led by Japan (Taeuber, 1958) and then followed by the Republic of Korea; overseas Chinese in East and South-East Asia such as in Hongkong, Taiwan, and Singapore; and in the major cities of China, Thailand, and Indonesia (see McDonald, 1993; Rele and Alam, 1993 : 15-37; and Leete, 1996).

Most reviews conclude that there is no single explanatory model that can be drawn from either the European or Asian fertility decline experience. This opens the possibility of the further study of fertility, especially in sub-national groups in a relatively heterogeneous population. This type of study will not only enrich the findings in other places but also strengthen similar findings from different cultures, social backgrounds and economic settings.

Indonesia is the fourth most populous country after China, India, and the United States of America. Indonesia not only has a large population, but also it is the home of hundreds of ethnic groups, speaking different languages. Religion is

predominantly Muslim but the other major world religions, Christianity, Buddhism, and Hinduism, are also present in addition to the pre-existing indigenous religions. The ethno-linguistic diversity is large, as (Geertz, 1983 : 24) summarises: 'There are over three hundred different ethnic groups in Indonesia, each with its own cultural identity, and more than two hundred and fifty distinct languages are spoken'.

While the likelihood of gross error in conclusions drawn from an individual country fertility study is less in countries with relatively homogeneous populations such as Japan, South Korea, Hongkong, or Taiwan, such errors could arise in a national study of a heterogeneous population like that of Indonesia. Therefore, studies at the sub-national level are more important in Indonesia: a sub-national fertility study will uncover more detailed explanations than national studies. This approach has been adopted by Hull (1975); Hull and Tukiran (1976); Hatmadji and Suradji (1979); Streatfield (1986); Adioetomo (1989); Hatmadji (1990); and Adioetomo (1993).

At the national level, fertility has declined in Indonesia since the early 1960s (McNicoll and Singarimbun, 1983). A recent study also shows the continuing decline as can be seen in the following table.

Table 1.1. Total Fertility Rates in Indonesia : 1967-1989

Source	Period	TFR	% decline
1971 CENSUS	1967-1970	5.60	
1976 SUPAS	1971-1975	5.20	7.2
1980 CENSUS	1976-1979	4.68	10.0
1985 SUPAS	1981-1984	4.05	13.3
1990 CENSUS	1986-1989	3.33	18.0
1995 SUPAS *)	1991-1994	2.80	18.9

Source: (Biro Pusat Statistik 1994:23); *) (Biro Pusat Statistik, 1997:16)
Note : Calculated using Own Children Method.

Table 1.1. shows that in two decades the Total Fertility Rate (TFR) in Indonesia declined by about 2.3 children per woman. In the past two five-year periods, the decline has accelerated. In those periods, the figures show declines of about 13 per cent and 18 per cent respectively. However, since Indonesia has a heterogeneous population, the levels and the decline of fertility vary in sub-national populations. The major differences are between Java (including Bali) and other islands.

Most sub-national population studies have focused on Java, not only because Java has more than half of the Indonesian population, but also because it has been the centre of government administration since the Dutch colonial time (Keyfitz, 1965; White, 1973; Hull, 1975; Alexander and Alexander, 1979; Hatmadji and Soeradji, 1979; Aass, 1980; Adioetomo, 1981; Freedman et al., 1981; Geertz 1983; Hatmadji 1990; and Adioetomo, 1993). Another reason is that there has been an outstanding decline in the fertility level in Java despite the relatively low levels of socio-economic indicators.

Most other parts of Indonesia are known to have higher fertility. The decline of fertility in those areas has been slower than in Java. In some areas the large family norm still persisted at least until the last decade. In those areas, group norms play an important role in daily lives. These norms are formalised into a body of customary law (*adat*) which is significant for the study of demographic behaviour (Hugo et al., 1987 : 18). However, the Indonesian government has not allowed the inclusion of ethnic identity information in censuses or surveys. Such information is intentionally omitted from all official data collection because of 'the potential divisiveness of ethnic identity in Indonesia'. Because of this, an ethnolinguistic approach is the most appropriate (Hugo et al., 1987 : 18), because language spoken at home is a good indicator of ethnicity in most regions.

Each region in Indonesia has different population characteristics, cultures, and traditions. However, most of the provinces outside Java are inhabited by relatively homogeneous populations. Even though there is usually more than one ethnic group living in a province, one group tends to be a majority. North Sumatra, however, is inhabited by several major ethnic groups without any majority among them. This province, which is also the biggest province outside Java, has a rapidly growing economy (Barlow and Thee, 1989). The unique social and economic characteristics of the province make it a suitable place to study the fertility transition. This thesis examines the relationship between ethnic identity and fertility change in this province.

North Sumatra can be divided into several geographic settings: the lowland area, the coastal plain, the mountainous region, and the hilly coastal region. Barlow and Thee (1989) observe that these regions have experienced different stages of economic development. This thesis observes whether the differing economic conditions of regions have had an effect on fertility decline in the province.

Christian missionaries initially established education in North Sumatra at the beginning of the twentieth century that was later followed by Islamic institutions. In the past two decades, the number of schools and education facilities has increased substantially. Together with ethnic identity, and regional settings, the effect of education on fertility is the focus of this thesis.

1.2. Objectives of the thesis

The main objective of this thesis is to determine the factors associated with fertility decline in North Sumatra during the period between 1980 to 1990. In fact, this study observes (1) fertility differentials and changes, and (2) relationship between ethnicity and fertility change. The ethnic language measures ethnic identity, while fertility change is measured by Coale indices. Similar relationship between education for women and different living environment as indicated by different regions in the province is also observed.

The specific objectives of the thesis are:

(1) to calculate the Total Fertility Rates at the provincial levels, according to ethnic groups, mother's education, and regions in North Sumatra;

(2) to calculate the coale indices of fertility according to ethnic groups, mother's education, and regions in North Sumatra,

(3) to observe the change of fertility through the change of Total Fertility Rates and Coale indices, and finally

(4) to determine the underpinning factors of fertility change through observation of Coale indices component of change.

1.3. Theoretical background: a study of literature

The demographic transition theory was first developed at the beginning of the twentieth century. The theory was developed by Landry (1934) and then refined by Notestein (1953) and Thompson (1959). According to the theory, industrialisation improves the standard of living and leads to the improvement of health conditions. This will be followed by the rapid decline of death rates, while fertility still remains high. Accordingly, this leads to a high growth rate of population. The society, then, adjusts its growth with low fertility because of the new, high rates of child survival. The fertility, then, declines until it reaches its lowest level.

The demographic transition theory was later challenged by the findings of the European Fertility Project (Coale, 1973b). Most of the findings of this famous project suggest different reasons for fertility decline from those described in the theory. McDonald (1993 : 7); and see also Leete, (1996 : 32-33), have comprehensively summarised the findings as follows:

- The decline was achieved everywhere by methods of fertility control such as withdrawal, abstinence, and abortion. Thus, the decline was not due to the discovery and dissemination of new methods of fertility control.
- The relationship of the fertility decline to trends in infant mortality was not strong
- In general terms, the spread of fertility control was opposed by the establishment, including churches and the medical profession.
- There were numerous exceptions to any postulation of the relationship of the fertility decline to modernization factors such as industrialization, urbanization, and education. The early commencement of the decline in France was the most striking exception to such relationships.
- Despite exceptions across regions of Europe, within regions, and in broad terms, the decline began earlier among those in urban areas, those who were better educated, those who were more secularized, and those who worked in new industrial occupations.
- Most importantly, however, once early cessation of childbearing had become prominent among the more modernized groups in a society, it was very rapidly adopted also by the remainder of the society for whom the theory would suggest there was little or no advantage in the adoption of small family size.
- Finally, fertility decline tended to occur simultaneously among groups sharing a common culture and language

.

Coale (1973b: 65) pointed out that there are three broad prerequisites for marital fertility to decline:

> (1) Fertility must be within the calculus of conscious choice. Potential parents must consider it an acceptable mode of thought and form of behavior to balance advantages and disadvantages before deciding to

> have another child - unlike, for example, most present day Hutterites or Amish, who would consider such calculations immoral, and consequently do not control marital fertility.
> (2) Reduced fertility must be advantageous. Perceived social and economic circumstances must make reduced fertility seem an advantage to individual couples.
> (3) Effective techniques of fertility reduction must be available. Procedures that will in fact prevent births must be known, and there must be sufficient communication between spouses and sufficient sustained will, in both, to employ them successfully.

In later years, these prerequisites, especially the second and the third, have been used to explain the fertility decline occurring in the developing countries, especially Asian countries. Using this framework of thought, many studies have been conducted to improve the fertility decline theory (see Leete, 1996). The complex, not strong relationship between socio-economic determinants and fertility decline found in the European Fertility Project was also found in the World Fertility Survey (WFS). These surveys were carried out in the 1970s and 1980s (Cleland and Hobcraft, 1985; and Cleland and Wilson, 1987). The findings of these surveys show that development can affect differently the fertility of sub-populations living in the same areas (Leete, 1996). This especially applies in countries where socio-economic development is still in progress.

The evidence shows that the experience of fertility change in Asian countries is different from the experience of Western European countries. As Coale and Watkins (1986a) indicated the differences are:

> (1) the discovery and dissemination of new methods of fertility control in contrast to the natural methods such as withdrawal, abstinence, and abortion used at the time of the European fertility transition; (2) with exceptions, family planning was supported by centralised anti-natalist governments (such as Japan, China, Taiwan, Thailand, Indonesia, or Vietnam); (3) the decline occurred in almost all socio-economic strata, compared to first existing among prominent groups who had early cessation of childbearing, followed by adoption by the remainder of the society even though theoretically there was little or no advantage in small family size.

McDonald (1993) indicated additional differences between European fertility decline and Asian fertility decline as follows:

- The family system is a much stronger feature of social organization in Asia than was the case in Western Europe. In particular, obligations across generations have a much greater, often spiritual, significance.
- Women's status varies enormously across Asia, but, overall, is significantly lower than was the case in Europe.
- Elementary education is much more widespread in Asia.
- Asian populations are less urbanized and levels of industrialization vary greatly. Conversely, access to modern technology and exposure to the world economic system are much greater than was the case in Europe.
- Communications and transport are much more highly developed in Asia and levels of population mobility are much greater.
- At the onset of fertility decline, Asian societies have lower mortality, higher population growth, and, in many cases, a much larger population base.
- Asia has been characterized by early and universal marriage.
- In several parts of Asia, pre-transition marital fertility levels are lower than was the case in Europe.
- The option of substantial out-migration is not available to the populations of Asian countries, as it was to many of the populations in European countries. (McDonald, 1993: 12-13)

McDonald (1993) adds that the theoretical framework that best captured differences in the European and Asian fertility declines is the one proposed by McNicoll (1980). He summarises McNicoll's arguments as follows: (1) fertility

decline is often relies on prior institutional change in the particular society; (2) institutional changes associated with the growth of modern state may drastically alter previous, lower-level institutional arrangements, particularly inter-generational and intra-couple power relationship; (3) the changes may be associated with the advance of education in the society, the ability of the state to control forces opposed to change such as conservative religious leadership; and (4) intervention by the state in the promotion and organization of family planning programmes. (McDonald, 1993: 13)

He further states that 'McNicoll's framework is much more applicable to Asian societies in the post-Second World War era than it would have been to European populations in the late nineteenth century' (McDonald, 1993: 13).

1.3.1. Schools of thought in fertility decline theories

In general terms, theories of fertility decline can be divided into three main groups: the structural, ideational, and institutional schools of thought. The distinction among the schools sometimes is not clear; there is a possibility that in practice they are inter-linked.

The structural theory contends that the decline of fertility occurs in the context of structural change in a society. The structural context includes modernisation, urbanisation, or mass education. The demographic transition theory based on Western European experience is part of this school. The advancement in

modernisation leads to a better standard of living, and eventually leads to better health conditions. As a result of this, mortality declines in line with the improvement. This is followed by the decline of fertility as high fertility can no longer be supported by the society.

Some economists have tried to extend the theory based on macro-level ideas of demographic transition to micro-economic models. The theory assumes that an individual couple chooses to maximise their satisfaction. The number of children, like all consumer goods has a utility function. With economic constraints such as the couple's income and wealth, a couple decides how many children they want to have. The utility of a child, or the 'price' of a child, is the function of the income and its position against other economic goods. Parents will decide the number of children, which provides the greatest satisfaction (Becker, 1981; McDonald, 1993; and Leete, 1996;). The United Nations (1990) has extended and elaborated the theory by incorporating 'taste' and 'supply' variables.

Leete (1996) has summarised Easterlin's (1975) framework as follows:

> the determinants of marital fertility and completed family size work through a family's preference for consumption, children, and fertility regulation, as well as through a set of four constraints: budget, a household's technology, a birth production function, and an infant mortality function (Leete, 1996: 33).

Some authors such as McDonald (1993) and Leete (1996) argue that this theory is lacking in explanatory power. The weakness is mainly in the

assumption that a consistent target is set by a couple at, or soon after marriage. In practice, the changing socio-economic environment makes it difficult for a couple to be consistent with their target.

Another theory based on demand theory is that of the intergenerational flow of wealth proposed by Caldwell (1982). This theory is that in the context of compulsory mass education and labour laws, the inter-generational flow of wealth changes direction. In this condition, the price of a child increases dramatically so that parent thinks of having more children is no longer beneficial to them. Fertility then starts to decline. This theory is based on a micro level economic model, but is strongly associated with macro-level social change (see McDonald, 1993).

Lack of supporting evidence has resulted in many authors questioning this theory (Knodel, 1977; Lesthaeghe, 1983; Cleland and Hobcraft, 1985; Cleland and Wilson, 1987; and Watkins, 1987). These authors believe that cultural factors are the primary determinants of fertility and fertility change. Empirical evidence shows that cultural factors are associated with the change in fertility. This is the basis of ideational theory.

Cleland (1985) points out that in the ideational theory, fertility change is seen as the result of a process of spreading new aspirations or attitudes toward family formation and fertility control. This change is not due to the change of economic roles of family units or of children.

Cleland (1987) points out that culture and education are two important factors in the initial process of spreading new ideas. The evidence from the European Fertility Survey, as well as studies of fertility decline in developing countries in the post World War II era, shows that in a culturally homogeneous population the use of fertility control has spread rapidly (Leete, 1996); this indicates that the process of accepting new ideas (fertility control) is associated with the social network. The link to the social network is ethnicity, or common language. Watkins (1987) sees this as the mechanism of diffusion in a society; she also states that group pressures can have a great influence on individual fertility behaviour.

In a society where group influence is very strong, like some traditional ethnic groups, the spread of newly accepted ideas can be very quick. McDonald (1993) gives as an example that contraceptive use can spread rapidly even in a community where an individual couple is inhibited from using it. This occurs if, in any way, the group finally accepts the new idea. The assumption of this theory is that there is a 'latent desire' for fertility reduction. The ideationalists argue that the 'latent desire' is developed in the condition where mortality has declined. This condition is the 'catalyst' undermining the 'reproductive imperative' and giving rise to the latent desire (Leete, 1996). The strength and generalisation of this assumption, however, is still questionable. This means that the assumption might not be applicable in all societies. It seems to be

more suitable in a heterogeneous society with different phases of the spread of new ideas.

Some authors argue that the ideational theory alone cannot comprehensively explain the phenomenon of fertility change. They believe that the ideational school of thought can be inter-linked with the structural school. In practice, the diffusion of ideas occurs mainly in the context of structural change. Models that interlink the structural and ideational schools have been developed by Retherford (1985) and Lesthaeghe (1988).

Another theory explaining the change in fertility was first proposed by McNicoll (1980): that fertility change occurs in the context of institutional change. Institution is broadly defined as 'the behavioural rules governing human actions and relationships in recurrent situations'. This includes 'the family and local community; family and property law and the local dimensions of public administration; the stratification system and the mobility paths it accommodates; and the labour market' (McNicoll 1993 : 6). The growth of the modern state will affect the existing institutional arrangements, and intergenerational, or intra-couple relationships. This can be associated with some factors such as mass education, state control of the resistant conservative leaders, or with the promotion and organisation of family planning program. The question that may arise in this theory is: what are the factors of change at the macro level?. Incorporating the political economy of fertility in the macro level change can answer the question; this has been pointed out by

Greenhalgh (1990), who emphasises the importance of linkages between local, regional, and global processes.

1.3.2. Culture and fertility change

This section discusses the literature on factors related to fertility change; the emphasis is on culture, education, and regional settings, factors that are thought to be related to the fertility change in North Sumatra. Empirical and non-empirical evidence from other studies also discussed.

As mentioned earlier the results of the European Fertility Project suggest that cultural factors, such as common language or religion, have a strong association with the change in fertility. Fertility has changed in the same place among those who have a common language, or the same religion regardless of the geographic locations (McDonald, 1993). According to the ideational theory, the change occurs through the process of diffusion of ideas within the family in the group. The question is how the process works. Until recently, there is no general postulate that is applicable to every society, especially Asian developing countries. The results of individual study, however, are useful for comparative purposes.

The North Sumatra setting consists of people of different cultural backgrounds that live in the same geographical location. It is also interesting to know how different cultural backgrounds respond to the same socio-economic settings.

Because they live in the same province, they share a common socio-economic setting. The other typical characteristic of this province, as Barlow and Thee (1989) point out, is the unequal development within the province. As is described in Chapter 2 of this thesis, PEMDA-SU (1988) divides North Sumatra into four sub-provinces or regions for its socio-economic development. This division is based mainly on the advancement of the development stage. It is, however, also related to different geographical settings. It is also interesting to see whether the regional settings respond differently to fertility change.

In traditional cultures, a norm of high fertility persists. This is due mainly to factors such as the expectations of the older generation about the younger generation, group interests, and the low status or autonomy of women especially in the household. It is common in Asian society, including in North Sumatra, that parents expect that children will take care of them when they are old. This is understandable since pensions, health care systems, and elderly institutions are not yet well established. Besides, it is a common tradition that the children support the parents, especially when they get old; the society will condemn the children who ignore their own parents. In a society, group pressure normally comes from relatives or people from the same ethnic group. In North Sumatra, this phenomenon is still common across all cultural groups. A good example that may be applicable to many societies in Asian countries can be found in the study by Knodel et al. (1987) in Thailand. A response from their

study shows what the parents expect of their children, especially when they get old (Knodel et al., 1987 : 146) :

> When we are sick, when we are old, we expect our children to cook and get food for us, to get water for us. We are not strong enough to fetch water, so we want to depend on them. If we do not have any strength to work, have no money, we will depend on them. (older women, central region).

However, the effect of this expectation on fertility is not clear. This will depend on the futures that parents expect their children to have. In traditional societies, the quantity of children is more important than the quality. However, in the context of changing socio-economic development this view might be changed. In non-agricultural societies, the tendency to have educated children is stronger than in agricultural societies. In the context of better information, communication and transportation this tendency can also change. Many farmers will educate their children so that they do not have to become farmers. This occurs in areas where the agricultural economy is no longer suitable because of low land productivity or small land ownership.

The second cultural factor that may be related to fertility is group interest, which is usually related to the survivorship of the group in the long run. This can relate to the kinship system or sex preference. It is believed that the bigger the group the stronger the group in the society. Traditional cultures usually have an extended-family kinship system; the value of children in such a society is high. As Caldwell (1982: 333) pointed out, in such a society 'most people-and nearly everyone in rural areas-equated large families with strong, powerful and

successful families'. Male sex preference in the patrilineal kinship society is usually strong. The Batak people of North Sumatra have a patrilineal kinship system. The effect of socio-economic development is usually associated with urbanisation, industrialisation, and mass education. This means that fewer families depend for their livelihood on subsistence farming, in which they consume most of their agricultural product. As a result, a family has to buy the household needs, including food; accordingly, household expenditure increases quite substantially. This condition, together with the child's educational cost, increases the cost of raising children. Therefore, even though large families are still preferred by the group, the number of supportable children will decrease.

The third factor that is related to culture is women's status. Generally, the status of women in a family is associated with the number of children they have. Evidence from the European Fertility Project and in a study in Thailand shows that fertility declines rapidly where the status of women in a family is high or egalitarian. (Coale and Watkins, 1986b; and Knodel et al., 1987); however, fertility in Japan dropped dramatically in a context where the status of women in a family was still low (McDonald, 1993). Therefore, evidence on the relationship between fertility and women's status is variable. In North Sumatra, women's status in a Batak family, especially in relation to the decision to have children, is relatively low when compared to other ethnic groups such as the Javanese, Chinese, or Malay groups.

In Indonesia, including North Sumatra, another external factor that can influence the decision-making process in a family is the role of formal and informal leaders in the society. This has been shown to be one of the explanatory factors for the rapidly decline in fertility in Java and Bali. Adioetomo (1993) in her study in Java found that the family planning program succeeds in areas where the government officials and program implementers are very influential. However, she also concludes that the setting for fertility decline in Java includes high status of women and lack of religious leaders opposing family planning. This setting is typical in Java, especially East Java and Central Java.

Knodel et al. (1987: 11) point out that fertility can change if the reproductive attitude, among others, shows a 'latent demand for reduced fertility'. In this context, fertility will decline even faster if modern contraception is systematically and readily available. Hull (1987) wrote that one of the conditions for the rapid decline in fertility is the ready availability of improved birth control procedures.

1.3.3. Cultural groups in North Sumatra

The Batak ethnic group in North Sumatra is known to have a strong kinship system. The smallest kinship bound in this ethnic society is called *jabu* by the Karo Batak, and *ripe* by the Toba Batak (Bangun, 1995). The literal meaning of the term is spouse. In the broader sense it includes the spouse's relatives. All family decisions usually begin with discussion with the *jabu*. In the context of

child preference and family size, it is the *jabu* of the husband's side who traditionally make the decision. The husband is influenced by his older generation. The main reason why the older generation is involved in the decision is related to the continuity of the family line. Bataks are also known to have high fertility (Tan and Soeradji, 1986).

Most of the Javanese in North Sumatra have settled there since the beginning of the century. The majority of them originally came from Central and East Java. Despite adaptation to the new environment, the main stream of their culture and tradition is still greatly influenced by their ancestors. In Javanese society, the formal and informal leaders play an important role in daily life (personal observation). In such society, the leaders initiatives are usually followed by their people (personal observation). According to my personal obsevation the Javanese kinship relationship system is not as strong as that of the Batak people; the concept of *ripe* or *jabu* is not known. This means that the decision to limit the number of children is very likely to be influenced by the community leaders, such as by the head of village or formal leader (*kepala desa* in the rural areas, *lurah* in the urban areas). In the village areas in Java, the head of a village is normally elected, therefore the person is usually accepted by most of the society. This type of leader still exists in the Javanese society in North Sumatra. However, their influence is not as strong as in Java.

The Malays in North Sumatra are one of the indigenous groups. In the past the Malay were known for their kingdoms; therefore, the Malay people are used to

living in an autocratic society. Even today, most of the Malay royal offspring use their title in their names, which indicates that this society still recognises the royal hierarchy. That of the religious leaders, some of who are also the offspring of the kings, however, has replaced the power of the kings and their offspring. Since the majority of the Malay people are Muslim, the religious leaders are the Muslim leaders. In my personal observation, the decision making process is likely to be influenced by Islamic teachings as interpreted by Muslim leaders (*Ulama*).

Fertility will remain high in a Malay society where the informal leaders think that family planning is against Islamic teachings. This ethnic group is characterised by a relatively closed society, low status of women, and low levels of economic development and education. In North Sumatra, this type of society can be found mostly in the coastal areas where the main livelihood is traditional fishery.

The Chinese society in North Sumatra is still influenced by the Chinese community outside North Sumatra. This is because the Chinese in North Sumatra are mostly involved in trading businesses. In my personal observation, I believe that it is not unusual that they have business counterparts in the neighbouring countries where Chinese dominates the economy, such as Singapore, Malaysia or Hongkong. Most of the Chinese communities in Indonesia, including those in North Sumatra, live in urban areas. The increasing cost of raising children is much higher in urban areas than in rural

areas. Therefore, it is very likely that situation will have an effect on the fertility of this ethnic group, which eventually lead the fertility to decline quite rapidly.

1.3.4. Education and fertility

Mass education, especially female education, is one of the most important determinants of fertility decline (Caldwell, 1976b; Freedman and Casterline, 1979). Empirical evidence, especially in developing countries, shows that education has a negative impact on fertility (McGreevey and Birdsall, 1974; Cochrane, 1979; Caldwell, 1980; Mason, 1986; Freedman et al., 1988; Population Newsletter, 1993; Castro Martin, 1995; and Forum, 1995). Even though this is not universal, it is relatively easy to explain the exceptions.

The effect of education on fertility in Indonesia is different from the experience in other countries. Some studies in Indonesia have shown a different pattern: the pattern of the relationship between fertility and education has an inverse U shape (Hull, 1976; Hatmadji and Soeradji, 1979; Supraptilah and Soeradji, 1979; Hatmadji et al., 1982; and Adioetomo, 1984). There is a positive relationship between education and fertility from the low levels of education up to senior high school, then the relationship becomes negative. Evidence from the World Fertility Survey data shows that this educational threshold occurs in countries that are just beginning to develop (United Nations, 1983).

There is no single answer to why this occurs. A more complicated issue is to explain how education can cause the decline of fertility. Education can indirectly affect fertility through the role of women. This effect operates through the increase in age at marriage or first conception, labour force participation, social mobility, economic utility of children, exposure to mass media, knowledge and use of contraception, husband-wife communication, and infant mortality. One author describes the indirect effects of female education on fertility in nine propositions (his other three propositions are on the interaction effects) as follows (Kasarda, 1979 :3-9):

- Proposition 1: *Increased female education delays age at marriage (or consensual union) and age at first birth which, in turn, lowers completed fertility.*
- Proposition 2: *Increased education enhances a woman's prospects for obtaining employment outside the home that competes with bearing and raising children as a career.*
- Proposition 3:*Increased education of females fosters higher social and economic mobility which is conducive to the option of smaller families.*
- Proposition 4:*Increased female education reduces the perceived economic utility of children, thus lowering the demand for them.*
- Proposition 5:*Female education increases exposure to mass media and printed materials concerning family planning.*
- Proposition 6:*Increased female education provides directly or facilitates the acquisition of information on modern contraceptive devices and use.*
- Proposition 7:*Increased female education improves communications between husbands and wives in ways that are conducive to lower fertility.*
- Proposition 8:*Increased female education indirectly affects fertility by reducing infant and child mortality.*
- Proposition 9:*Education imparts a woman with a sense of self-efficacy, a positive feeling of control over her own body and fate, and a trust in science and technology, all of which promote her use of contraception to limit her fertility.*

Elementary education in Indonesia is almost universal nowadays, and is compulsory. Most developing countries have a compulsory education program at least for the first six years, which aims at educating people, regardless of sex. Therefore, it will extend the time before first marriage for women. Even though the timing of marriage is not a deliberate means to bring down fertility levels, it is known to be associated with the timing of the first birth (McDonald, 1981). Together with other cultural factors, such as breastfeeding practices and beliefs about child survival, the prolonged delay in first marriage will reduce fertility, especially in a country where young marriage is still practised.

Caldwell (1976a) stressed that modernisation is associated with the decline of fertility. While there is a wide debate about its relationship, many agree that the rise of female labour force participation is associated with lower fertility. Kasarda et al. (1986), for instance, found that working women had smaller completed family sizes. The participation of women in the labour force, as in the modern society, will change the direction of the 'the net flow of wealth' from the older generation to the younger generation (Caldwell, 1976a) Accordingly, to raise children will mean an increase in the cost of living. In general, with a better education, a woman is more likely to join the labour force.

Education, especially formal education, will help a women to increase her knowledge, and change her attitude to the practice of contraception. The use of contraception has been categorised by Davis and Blake (1956) and later re-specified by Bongaarts (1978) as one of the proximate determinants of fertility.

In fact, McDonald (1993) stresses that this factor is one in the important explanatory factors of the decline of fertility in Asian developing countries. The contraception that is widely available in the developing world nowadays is mostly modern methods. Even though in some societies, traditional forms of contraception have been available for a long time, they are not as effective as the modern methods. Fertility will decline faster in countries where the government legally provides the contraceptive methods and encourages family planning.

Education of a woman can also open the possibility for her to have social mobility. Women with high education are accorded high social status; education enables them to have a better position in the social life of the community. Consequently, this reduces their dependency on their children for economic assistance and thus encourage small family size. However, this relationship is not clear in a society where the status of women is still low. Therefore, as Kasarda et al. (1986) noted, a shift is required from a predominantly male-dependent status orientation to a more female-oriented focus.

Education not only leads to a woman having a better understanding of the costs and benefits of having children, but it also means that she will have aspirations for better education for her children. With the increasing costs of educating children, the woman tends to decide to have fewer children. This is

exacerbated by the fact that the longer the children attend school, the longer is the burden for the parents.

Mass media and printed materials concerning family planning are used by family planning institutions or authorities to spread information. The higher her education, the more the woman is exposed to this information. This consolidates the process of adopting the new idea of a small-family norm. Finally, female education enhances husband-wife communication and this is conducive to smaller family size because the couple is more likely to discuss their ideal family size and the ways to achieve it, such as the use of contraception.

1.4. Analytical framework of the study

Fertility variations are indirectly influenced by behavioural and biological factors. Davis and Blake (1956) first proposed the factors later known as proximate determinants of fertility. Other variables, socio-economic, cultural, political, psychological or environmental, can only operate through these factors (Knodel et al., 1987). They can be grouped into three broad categories: intercourse variables; conception variables; and gestation variables. Intercourse variables consist of (1) age of entry into sexual union, (2) permanent celibacy, (3) amount of reproductive period spent after or between unions, (4) voluntary abstinence, (5) involuntary abstinence, and (6) coital frequency. Conception variables consist of (7) fecundity or infecundity as affected by involuntary causes, (8) use

or non use of contraception, (9) fecundity or infecundity as affected by voluntary causes. Finally, gestation variables are (10) foetal mortality from involuntary causes, and (11) foetal mortality from voluntary causes. Bongaarts and Potter (1983) later developed this set of proximate determinants variables by reformulating them to become quantifiable. As summarised by Knodel et al. (1987 : 10), the proximate determinants are as follows:

1. Marriage and Marital Disruption
The proportions of women in reproductive ages who are exposed to coitus as determined by the age of entry into marriage (or more strictly, sexual unions) and their durations.
2. Onset of Permanent Sterility
The proportions of couples physiologically incapable of reproduction as determined by the age at which men and women become sterile. (This reflects both primary sterility, the inability to bear any children from the beginning of sexual activity, and secondary sterility, the eventual loss of reproductive capabilities).
3. Duration of Postpartum Infecundibility
The duration of the anovulatory interval following a birth during which a woman is not susceptible to conception (dependent primarily on breastfeeding patterns).
4. Fecundability
The monthly probability of conceiving among menstruating women not practicing contraception (dependent primarily on coital frequency).
5. Spontaneous Intrauterine Mortality
Nondeliberate miscarriage and abortion.
6. Contraception
The prevalence and effectiveness of contraceptive practices.
7. Induced Abortion
Deliberate interventions to terminate pregnancies.

A change in one of the proximate determinants, assuming the other determinants are constant, will change the level of fertility. This is not always the case with the non-proximate determinant variables. A change in levels of education, for instance, will not necessarily change the level of fertility.

However, non-proximate determinants such as socio-economic, cultural or environmental variables usually only affect the variation of fertility behaviour variables. Of the proximate determinants, the variables potentially affected are marriage and marital disruption, contraception, and induced abortion. (Adioetomo et al., 1989).

In Indonesia, including North Sumatra, the government has an anti abortion policy; however, this does not mean that there is no abortion in Indonesia. The government allows abortion only for medical reasons, which means that abortions for non-medical reasons are performed illegally; abortion, therefore, is the last means of limiting family size in the society. This option is mainly chosen for unwanted ex-nuptial pregnancies mainly among young people. The effect of this variable is presumed to be minimal to this study, since it is only related to marital fertility.

This study focuses on the effect of socio-economic, cultural, and geographic factors on fertility through its proximate determinants. The role of culture, education, and geographical settings, which Bongaarts (1978) defines as environmental variables, are the main focus of the study.

The framework operates within a cultural context, especially that of North Sumatra. Therefore the determinants of fertility are conditioned by the context, for example, the status of women and the nature of husband-wife relationships

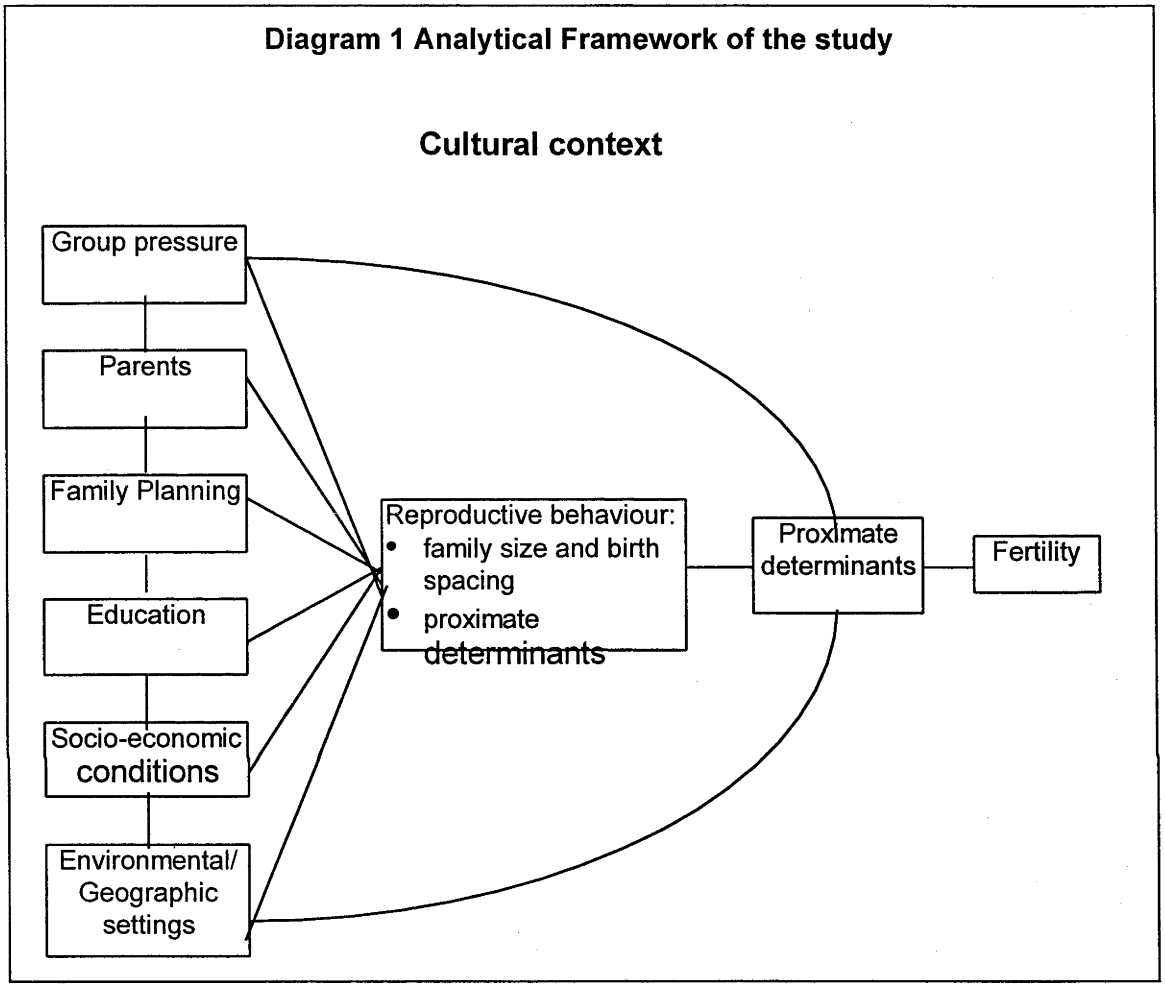
vary according to cultural background. In some cases this is related to the identity of the ethnic group.

As mentioned earlier, fertility changes through the proximate determinants. The relationship between the proximate determinants and fertility is obvious. For example, a rise in age at the first sexual union is followed by a decline in completed fertility for that particular woman, if all other determinants are constant. Fertility behaviour in a family includes behaviour related to family size and birth spacing, and proximate determinants. As Knodel et al. (1987) stated, family size and birth spacing behaviour within a family occur in the context of constant demand for reduced fertility. In Indonesia, and thus North Sumatra, this condition is related to the government's intensive family planning campaign, and socio-economic development. The success of family planning in other places such as in Java can be the example that creates the condition.

The fertility behaviour within a family as an integral part of the family itself is influenced by external factors. In North Sumatra the relevant factors are the parents, group pressures, education, geographical settings, the family planning program, and socio-economic conditions. This is because their relationship is conditioned by the cultural context. The diagram in Diagram 1 illustrates this. Fertility, then, is influenced by the direct determinants. Freedman (1975), however, noted that two societies with different levels of fertility might have similar values for some of the intermediate variables because of 'an unintended consequence of cultural patterns with no explicit connection to fertility'

(Freedman, 1975: 14-15). Therefore, it is better not to assume that the intermediate variables are always used deliberately to limit fertility.

Diagram 1 Analytical Framework of the study



Source: modified from Bongaarts (1978: 106); Knodel et al. (1987:11)

1.5. Structure of the thesis

After introduction of the thesis presented in Chapter 1, Chapter 2 describes the cultural, socio-economic, and geographical background of the study area. The cultural background of the ethnic groups included in this study such as the Batak, the Javanese, the Malay, and the Javanese is introduced. This chapter

also discusses the socio-economic development of the province such as in education and economic growth, based on secondary data. The unequal balance of economic development of sub-provincial regions is described in this chapter. This chapter assists to give the context where the thesis is developed.

Chapter 3 discusses the data and method of fertility analysis in this study, which is based primarily on the 1980 and 1990 census data. The data from the two censuses are used as the reference time based on the consideration of recentcy and availability of a more complete information from those censuses as compared to the earlier censuses. Additional qualitative information gathered from the field work is also included in this chapter to give more information that is not available in the secondary data and some explanation to the findings as the results of secondary data analysis.

Chapter 4 explores the role of ethnic identity in the decline of fertility in North Sumatra. This chapter aims at observing fertility levels and differentials through the calculation of Total Fertility Rate and Coale Indices by ethnicity. This chapter shows fertility differentials and fertility change by ethnicity.

Maternal education factor, which is likely to be contributed to the decline of fertility as observed in Chapter 5, used as one of control variables. This factor is categorised into low and high level of education. Break down according to ethnic groups of those educational categories is also discussed in this chapter.

This is to see the role of education in each ethnic group as one of the important factors in the decline of fertility in North Sumatra.

Other factor in North Sumatra that is believed to be related to the decline of fertility is sub-provincial region, which contains several *Kabupaten and Kotamadya* as indicated in Chapter 2. The region not only depicts specific geographical and cultural setting, but also shows different stages of economic growth. Because of this unique phenomenon, this thesis as indicated in Chapter 6, observes the fertility levels and change according to this category. Finally, Chapter 7 of this thesis summarises and concludes the findings indicating the factors underpinning the fertility decline in North Sumatra.

CHAPTER 2

DEMOGRAPHIC CHARACTERISTICS AND SOCIO-ECONOMIC DEVELOPMENT

2.1. Introduction

This chapter provides an overview of population in North Sumatra. A brief description of ethnicity, religion, and culture gives a better understanding of the people in North Sumatra and their traditions. The environment and characteristics of the people are summarised with information about geographical settings, population growth, and occupation. The chapter also describes government efforts to promote better living quality in the province through socio-economic development, which includes agriculture, manufacturing, transport, education, employment, and health. Finally, this chapter provides the dynamics of demographic characteristics of women in the province by reviewing trends in age at marriage, contraceptive use, and fertility.

2.2. Ethnicity, religion, and culture

Ethnic identity plays an important role in the daily lives of people in North Sumatra, because ethnic groups differ in traditions, religion, and culture. Each

ethnic or cultural group in North Sumatra is normally characterised by one particular religion; therefore, religion and culture cannot be separated.

In the past colonial time, North Sumatra was known as East Sumatra. The population in this province could be categorised into three major groups: indigenous, inter-provincial immigrants, and international immigrant groups. According to the then definition, the Indigenous people includes Malays, Karo Batak, and Simalungun Batak. Among the inter-province or inter-region ethnic groups are the Javanese, Toba Batak, Mandailing and Angkola Batak, Minangkabau, Sundanese, Banjar, and Acehnese. The non-Indonesian people were the Europeans, the Chinese, and others (primarily Indian). It is not mentioned about their citizenship.

In the results of the 1930 Census (as cited in Reid, 1979), the composition of ethnic groups shows that the Javanese in the region had the largest proportion followed by the Batak and Malays. The proportion was 35.0 per cent for Javanese, 22.1 per cent for all the Batak (Toba, Mandailing, Angkola, Karo, and Simalungun), and about 20 per cent Malay.

Thus, even as early as 1930, the Javanese were the largest group. Most of the Javanese living in North Sumatra now are the descendants of the Javanese who migrated to North Sumatra during the Dutch colonial times because of the new policy of the Dutch colonial government in 1870 to allow private Europeans and Chinese to obtain long-term leases of land (Hugo, 1980).

This policy caused a huge increase in private plantations in Java. Most of the fertile irrigated lowlands in Java were used up leaving little for the further growth of plantations. Consequently, by the late nineteenth century the colonial planters were forced to turn to the Outer Islands (Hugo, 1980). Before 1870, the economic activity of the Dutch colonial government had been limited to coffee cultivation, and coal and tin mining.

One of the strategic locations for plantations was the fertile lowlands of Sumatra, located on the major sea route to Europe. This location later became part of North Sumatra province. These locations were developed for tobacco and later for rubber, tea, palm oil and sisal (Hugo, 1980). Accordingly, this region became important for the Dutch colonial activity in the Outer Islands. As plantations are a labour-intensive activity, the planters needed a large number of plantation workers; they first recruited Chinese coolies to overcome the scarcity of labour in the region, but later they brought in the Javanese and Sundanese.

Plantation workers were recruited on the 'contract coolie system.' The coolies were recruited by agents for the planters; later, the recruitment was controlled by the Dutch colonial government to avoid the inhumane treatment suffered by the coolies, because of the agent's own interest that affect both employers and labourers relations (Furnivall, 1946; and Hugo, 1980).

Evidence of the population movement from Java to North Sumatra (East Sumatra) can be seen in the results of the 1930 Census results. Hugo (1980)

states that this was not just an entirely new form of movement in Indonesia, but also the first large interprovincial movement which originated from the Dutch colonial policy and practice.

The culture of this Javanese society is a blend of several Javanese sub-cultures, because the migrants come from several regions in Central, East, and West Java. In addition, the contract coolie system has influenced their behaviour in some ways. They are more egalitarian or as (Geertz, 1963: 59) said, 'permanent fully proletarianized workers'.

Most of them were unskilled peasants. According to my personal observation, most of the first generation plantation workers from Java started to learn Indonesian language (*Bahasa Indonesia*) after they migrated to North Sumatra. This is indicated by their brokeness in speaking *Bahasa Indonesia.* Their daily language spoken at home is 'Javanese' like language to differentiate with the original Javanese spoken in Java Island. This fact shows that the Javanese plantaion workers had very limited education.

The other characteristics of this particular ethnic group is their religion. Almost all of them are Muslim. This is confirmed by my personal observation in the plantation areas where the Javanese plantation workers said among themselves that the Javanese must be Muslim, if not they are not Javanese.

Until recently, most of the Javanese in North Sumatra lived in the plantation areas. Thus, their descendants have been exposed to this typical society.

Accordingly, they became a new type of society in North Sumatra that is different from other ethnic groups in the region or even from the society from which their ancestors originally came. They are commonly known as '*Jawa Deli*' (Deli born Javanese) or '*Putra Jawa kelahiran Sumatra*'(Sumatran born Javanese youth). However, like the majority of the Javanese, most of them are Muslim.

In 1948, East Sumatra province became part of North Sumatra that also included some highlands in the centre of the regions such as Tapanuli Utara and the west coast, and Aceh (Kantor Statistik Sumut, 1991a). Later in 1956, the Aceh Special Region (*Daerah Istimewa Aceh*) was separated from North Sumatra.

After 1956, the ethnic groups in the region were the Batak, Malay, Javanese, Chinese and other interprovincial migrants. The Batak include Karo Batak, Simalungun Batak, Toba Batak, Mandailing Batak, and Nias. The number of interprovincial migrants is small. According to the 1971, 1980, and 1990 censuses the intercensal net migration in North Sumatra is negative (Biro Pusat Statistik, 1993: 60). This means that there were more outmigrants from than inmigrants to North Sumatra.

In this study, the four main ethnic groups are examined: the Batak, Chinese, Malays, and Javanese. Their cultures and traditions and their religion are explained in the following section.

According to Bangun (1995) the Batak people of North Sumatra live in Karo highland, Langkat Hulu, Deli Hulu, Serdang Hulu, Simalungun, Dairi, Toba, Humbang, Silindung, Angkola, Mandaliling, and Tapanuli Tengah regency. The Batak speak the Batak language with different dialects, which are very similar though the Karo dialect is slightly different from the others.

Originally, the Batak people had spiritualist beliefs. Their religious thought was dominated by 'concepts of the supernatural' (Vergouwen, 1964). The beliefs have changed since the introduction of Islam and Christianity. In 1810 the Minangkabau in West Sumatra started to introduce Islam to the Mandailing and Angkola Batak. Christianity was introduced in about 1863 by Protestant and Catholic missionaries. Protestant teachings were brought by German missionaries to the Batak people in Toba and Simalungun regions. Catholic teaching was introduced to the Karo people by Dutch missionaries (Bangun, 1995).

Since then, Islam and Christianity have played an important role in the traditions and cultures of the Batak people. Some older traditions are no longer or very rarely practised in the society, such as polygyny, and divorce among the Christians. The exact proportions of the Muslim Batak and the Christian Batak are not known. As an illustration most of the Mandailing Batak are Muslim, while most Toba Batak are Christian. The Karo Batak have almost the same proportion of Muslims and Christians.

According to Bangun (1995) social stratification in Batak society is based on four aspects: age, rank and position, original descent, and marital status. Age is divided into three major groups: *orang-orang muda* (the youth), *orang setengah usia* (the middle aged), and *orang-orang tua* (the aged). The aged play an important role in the society where most of the *keputusan adat* (decisions on traditional activity) can only be recommended by them. The middle aged can only implement them, while the youth have no obligations or rights at all. However, according to a personal communication (1996) from a Batak person, marital status is the most important factor in the society before other factors.

The Batak people that are considered to have high rank and positions are the descendants of the 'Si Raja Batak' (the Batak Kings). The Bataks use the term to refer to their ancestors from whom they inherit their '*marga*': this is a term in the Batak patrilineal kinship system that means a group of people with the same ancestor. *Marga* is inherited by sons, and becomes extinct if no sons are born (Vergouwen, 1964).

Nowadays, *marga* can be recognised as the last name of the Batak people. The use of *marga* is similar to the use of surnames in Western culture. *Marga* plays a very important role in all traditional ceremonies. In the patrilineal kinship system, women use their husband's *marga* when they become married. Accordingly, most Batak people still prefer male children.

The Batak people recognise a traditional leadership concept. The leadership in the Batak people can be categorised into three types: leadership in traditional

matters (*kepemimpinan bidang adat*), leadership in government matters (*kepemimpinan bidang pemerintahan*), and leadership in religious matters (*kepemimpinan bidang keagamaan*) (Bangun, 1995).

The leadership in traditional matters is responsible for such things as marriage and divorce, death, inheritance, conflict resolution, and childbirth. The leadership is not a person, but a representative group; all the demographic decisions are influenced by this type of leadership. Leadership in government matters was last practised in 1946 (Bangun, 1995). After the influence of Islam and Christian teachings, leadership in religious matters is less practised. However, some of this type of leadership is still performed by traditional clairvoyants or traditional healers (*dukun*).

Unlike the Javanese and the Bataks in North Sumatra, the Malay people used to have kingdoms. Sinar (1994) states that the Malay kingdom existed as early as about 644. The Malays ethnic group in North Sumatra is only a part of the other Indonesian Malay who reside in West Kalimantan, Temiang (East Aceh), Riau, Jambi, and the coastal Palembang. In North Sumatra the Malays mostly live on the eastern coast. In a broader classification, the Malays also include the Malays in Southern Thailand, East and West Malaysia, Singapore, and Brunei. These Malays share a similar culture and traditions.

According to Sinar (1994) many historians see a strong relationship between the Malays and Islam. Therefore, he believes that Malay people are identical to Muslims. This is indicated by the interpretation of 'becoming Malay'(*masuk*

Melayu) as meaning 'convert to Islam'(*masuk Islam*). The value of children among Malay families is high. Hassan (1980: 86) illustrates this by the saying 'a house is not a home unless there are several children in it'. He also points out that the Malay do not have a preference in the sex of their children; they prefer to have children of both sexes. He notes that Malay men believe that the number of children reflects their virility; so that Malay men prefer big families.

The Chinese in North Sumatra came to the region at the beginning of the twentieth century, at the same time as the opening of plantations in the region. The Dutch colonial planters recruited the Chinese 'contract coolies' together with the Javanese. However, the offspring of these Chinese did not stay in the plantation areas, but moved to the trading centres in Medan or in other towns near the plantation areas.

According to the results of the 1930 Census in the colonial era, the proportion of the Chinese in East Sumatra was about 11.4 per cent (see Reid, 1979). This proportion makes the Chinese in North Sumatra one of the four major ethnic groups after the Javanese, all of the Batak people (Karo, Simalungun, Toba, and Mandailing), and the Malays.

If this proportion has not changed, this is the largest proportion of Chinese in any province in Indonesia, except West Kalimantan. The Chinese in Indonesia, including North Sumatra, tend to settle in strategic trading locations, enabling them to do business as their main occupation. The Chinese population in Medan, the capital city of North Sumatra province, was 12.8 per cent of the

total population in 1981 (Pelly, 1983: 103). Most of them live in the central business *kecamatan* (districts) such as Kecamatan Medan Kota, and Kecamatan Medan Baru (Hadiluwih, 1994: 170).

Hadiluwih (1994) in his research found that the Chinese in North Sumatra still have strong relationships with the Chinese outside Indonesia. They have trading counterparts in Canton (mainland China), Singapore, and Hongkong. He also refers to Rahman (1986); cited in Hadiluwih (1994) who found that the Chinese still communicate in Chinese dialects. These contacts also extend to family matters, as is indicated by the remittances sent to relatives in China, Hongkong, Singapore, and other places. Most Chinese are followers of Buddhism: there are several big Buddhist temples in Medan and its surroundings. Therefore, culturally, the Chinese in North Sumatra are not very different from others of Chinese descent in South East Asia.

Hassan (1980) noted that traditionally the age at marriage among Chinese men and women was much lower than is the case today; it was not uncommon for grooms to be 19 or 20 years old, and brides about 15 or 16. Most of these marriages, however, were arranged marriages. According to Hassan (1980), 'neither the groom nor the bride had a choice'.

According to Hassan (1980), by 1980 the age at marriage was about 26 to 27 for men and 21 to 22 for women. Freedman (1970) claimed that high age at marriage had been practised in earlier years, because there are beliefs among the Chinese community that young marriage is emotionally not stable and

financially not viable (Hassan, 1980: 20-21). Hassan (1980) also found that the Chinese had been using contraception in the form of traditional drugs and herbs; they also practised the 'safe period method'.

2.3. Geographic settings, population growth, and occupation

North Sumatra province is located between one and four degrees of North latitude and 98 and 100 degrees of East longitude. It borders Aceh Special Region (*Daerah Istimewa Aceh*) in the West, and Riau and West Sumatra provinces in the East.

This province covers the area of 71,680 square kilometres. The elevation from the sea level ranges from zero metre in Tanjung Balai or other coastal areas to as high as 1915 metres in Tapanuli Selatan regency.

Like other provinces in Indonesia, North Sumatra is divided into sub-province administrative areas. There are 11 regencies (*kabupaten*) and six municipalities (*kotamadya*). The *kabupaten* are Nias, Tapanuli Selatan, Tapanuli Tengah, Tapanuli Utara, Labuhan Batu, Asahan, Simalungun, Dairi, Karo, Deli Serdang, and Langkat, while the *kotamadya* are Sibolga, Tanjung Balai, Pematang Siantar, Tebing Tinggi, Medan, and Binjai.

The North Sumatra eastern coastal area is level and fertile, but often swampy. It also has a central spine of mountains. Only some parts of it are very fertile: these areas are in the high lands and valleys. On the west coast the land is hilly but less fertile.

Population growth in North Sumatra has been quite high in the past but has slowed down since 1980. Between 1971 and 1980, the population growth was 2.6 per cent per year. It dropped to about 2.1 per cent per year in the following decade. Population density in this province has also increased accordingly. It was 94 persons per square kilometre in 1971, 118 persons in 1980, and 145 persons in 1990; this density is higher than the national levels which were 62 persons, 77 persons, and 93 persons per square metre for 1971, 1980 and 1990 respectively (Biro Pusat Statistik, 1993).

North Sumatra's economy is still dominated by its agricultural sector: the majority of its people still depend on agriculture. Despite relatively high growth, the industrial sector is less influential. Most of the land on the eastern coast is used for plantations and lowland paddy fields. Table 2.1 shows that agriculture is still the main contributor to the Gross Domestic Product.

Economic development in North Sumatra is considered unbalanced (Barlow and Thee, 1989), because there are at least four regions that have experienced different stages of economic development. Therefore, the provincial government of North Sumatra has set its development plan in relation to these conditions.

Table.2.1. North Sumatra: Growth and Distribution of GDP, 1984-1990 (percentage)

Sector	Distribution 1984-1990	Annual Growth
Agriculture	34.5	8.1
Mining and quarrying	4.0	-0.5
Manufacturing	15.7	13.9
Utilities	1.0	14.8
Construction	3.5	2.8
Trade	15.6	8.7
Transport and communication	9.6	4.4
Finance, insurance, and rents	6.1	9.8
Individual and social services	10.0	5.2
Total / average	100.0	8.0

Source: Kantor Statistik Sumatra Utara: Pendapatan Regional Propinsi Sumatera Utara, 1983-1990 (Regional Income of the Province of North Sumatra, 1983-1990)

Notes: Distribution and growth are at constant 1984 prices, and not including oil.

The recent development plan in North Sumatra categorises the regencies and municipalities into four development regions (PEMDA-SU, 1988):

1. Development region I covers the west coast of the province centred in Kotamadya Sibolga. This region consists of Kabupaten Tapanuli Selatan, Tapanuli Tengah, Nias, and Kotamadya Sibolga.
2. Development region II covers the central spine of mountains of the province centred in Kotamadya Pematang Siantar. This region consists of Kabupaten Karo, Dairi, Simalungun, Tapanuli Utara, and Kotamadya Pematang Siantar.
3. Development region III covers the northern part of the east coast of the province centred in Kotamadya Medan. This region consists of Kabupaten Langkat and Deli Serdang, and Kotamadya Binjai, Tebing Tinggi and Medan.
4. Development region IV covers the southern part of east coast of the province centred in Kotamadya Kisaran. This region consists of Kabupaten Asahan and Labuhan Batu, and Kotamadya Tanjung Balai.

Barlow and Thee (1989: 409) show that unbalanced economic development occurred in the fertile but often swampy East Coast (Regions III and IV), the central spines of mountains with some very fertile but high-lying valleys (Region II), and in the undulating but less fertile area abutting the West Coast (Region I).

People who live in the middle spine of mountains (Region II) cultivate highland paddy fields and dryland crops, practice horticulture, and have smallholder plantations of coffee, and incense, with some big plantations. Most of this region is protected forest and thatch field. In the west coast (Region I), most of the land is infertile, especially in Tapanuli Selatan regency. In Regions III and IV, people grow lowland paddy, and most importantly annual crops in both small-holder and commercial plantations.

Whether these regions relate to levels of fertility is examined in this study. It is hypothesised that the socio-economic development leads to the decline of fertility as experienced in European countries at the beginning of twentieth century.

2.4. Socio-economic development in North Sumatra

North Sumatra's rapid economic growth has contributed to a strong economy in the region in the late 1970s and the 1980s. The annual economic growth of above seven per cent per annum would have had been expected to have a significant influence upon the livelihood of the people in the province. In the following sections, socio-economic development in the province is described.

2.4.1. Agriculture, manufacturing, and economy

As shown in Table 2.1. about 35 per cent is the average of GDP during 1984-1990 came from the agricultural sector. The growth rate of this sector is about eight per cent per annum, which is a similar level to the total economic growth

of the province for the same period. The agricultural subsectors were dominated by food crops, commercial and smallholder plantations, which contributed about 76 per cent of the agricultural sector (Kantor Statistik Sumut, 1991b: 19).

Unlike smallholder plantations, commercial plantations are managed professionally. The products are normally for export, through Belawan international harbour. These types of plantations, as explained earlier, have been in operation since the Dutch colonial government era. Since Indonesian independence, all the plantations have been taken over by the Indonesian Government. However, the change of management has only affected the middle to high ranking positions. The plantation workers are still the same people.

The new plantation administrators follow the traditions of the Dutch planters' system. Sairin (1991) in his study says that the management system in his study area was just the continuation of the management system used during the colonial period. The community in the plantation is divided according to hierarchies from the top manager (commonly called *ADM* which is derived from the Dutch word '*administrateur*') to the field plantation workers, most of whom are the descendants of the former contract coolies.

Some of the Javanese who no longer work in the commercial plantations, together with other indigenous ethnic groups such as the Malay and the Batak have cultivated smallholder plantations, producing tree crops such as palm oil

and rubber. The quality of the crops is mostly lower than that of the commercial plantations, but, in recent times, some of the commercial plantations have been buying the better quality products of the smallholder plantations.

Food crops grown in North Sumatra are not as good as those that grow in Java, because of the lack of irrigation. Food crops requiring good irrigation grow in only some parts of North Sumatra, such as Simalungun regency. Other food crops, mainly horticultural products, are grown in highland Karo and Dairi regencies.

Other important sectors are the modern economic sectors such as manufacturing, trade, and finance. The finance sector also includes insurance, and rents. These sectors are facilitated by the existence of Polonia international airport and Belawan international harbour in Medan, the capital of North Sumatra. Therefore, most of these forms of economic activity are concentrated in the surrounding areas; that is, in the northern part of the east coast. Economic development will have influenced the daily life of the people toward modernisation, which gives people access to information and the facilities of family planning.

Most of the road network in North Sumatra was established in the Dutch colonial era, so the people have no problems with transport and communication as in other regions in Indonesia. Nias, unlike other parts of the province, is

separated by the sea, which makes transport and communication difficult in this regency.

The level of mobility of the people in North Sumatra, especially the Batak people, is considered high, since the Batak can be found in almost all parts of the province, and even outside the province. This may be related to the ease of transport and communication in this province. The direction of the mobility is toward the developed areas in the eastern coast from the less developed areas on the western coast.

2.4.2. Education, employment, and health

Compulsory primary education throughout Indonesia started in 1973; it was marked by a dramatic expansion in the number for classrooms for primary education. This program was known as the *INPRES Sekolah Dasar* (Primary education under presidential instruction) program. The establishment of primary education together with the provision of teachers has reached the most remote areas in Indonesia (Hady, 1989).

This government policy substantially elevated the level of education among young people in Indonesia. In North Sumatra, the policy gave an additional advantage to the people who had already inherited good educational facilities from the Dutch colonial time. The religious institutions, Catholic and Protestant had established primary and secondary schools in colonial times, later followed by Muslim institution. Consequently, the education level in North Sumatra has

been higher than the national average. Educational indicators such as the literacy rate, the ability to speak Bahasa Indonesia and completion of education can be used to compare North Sumatra with the national average.

Biro Pusat Statistik (1993) indicates that the number of primary schools, junior high schools (*Sekolah Menengah Pertama* or *SMP*), and senior high schools (*Sekolah Menengah Atas* or SMA) had increased from 1978/1979 to 1990/1991, from 6,318 primary, 913 junior secondary, and 379 senior secondary schools to 9,257 primary, 1,796 junior secondary, and 1,246 senior secondary schools. The biggest change occurred at the senior high school level, with an increase of about 229 per cent.

Table 2.2. Percentage of population with completed education in North Sumatra: 1980-1990

Level of completed education	1980				1990			
	Rural		Urban		Rural		Urban	
	Males	Females	Males	Females	Males	Females	Males	Females
No education	60.8	71.8	34.4	43.2	42.1	51.7	22.1	28.5
Primary	26.3	21.4	29.8	31.0	32.7	30.6	28.6	30.4
Junior high	8.6	4.7	19.3	15.9	15.3	11.0	22.6	20.3
Senior high	4.1	2.0	14.6	9.3	9.4	6.4	23.3	18.9
Tertiary	0.2	0.1	1.9	0.6	0.5	0.3	3.4	1.9

Note: No education includes those with some primary schooling
Source: Biro Pusat Statistik, 1993

Table 2.2 shows the change in completed education for those who aged 10 years and over from 1980 to 1990. That the level of education in North Sumatra improved tremendously in the ten-year period is indicated by the substantial reduction in the proportion of people with no or some primary education both in rural and urban areas. In urban areas, there was also a reduction in the proportion who had only completed their primary schooling. In rural areas, there was a shift from the lowest level of education to primary education.

The effect of the change was greater for females than for males. The proportion of women with virtually no education declined substantially from 1980 to 1990. In rural areas in 1980, this proportion was about 72 per cent, but it had fallen to 52 per cent by 1990. The highest levels of education (senior high to tertiary) for both sexes doubled or even tripled in a decade both in rural and urban areas.

More than half of the working population in North Sumatra was attached to the agricultural sector. However there has been an increase in the percentage of the population working in modern sectors such as manufacturing and services (Table 2.3.). In 1980, about 60 per cent of men and about 77 per cent of women were working in the agricultural sectors. By 1990, these percentages had declined to about 57 per cent for men and 66 per cent for women.

Table 2.3. Percentage of working population based on the field of occupation, North Sumatra: 1980 - 1990

Field of Occupation	1980		1990	
	Males	Females	Males	Females
Agriculture	60.4	77.2	56.6	66.3
Manufacturing	10.1	4.5	12.7	6.9
Services	28.9	17.6	30.0	25.8
Other	0.6	0.7	0.7	1.0

Source: Census 1980 and 1990 (Biro Pusat Statistik, 1993: 89)

There has been an increase in the proportion of women working in non agricultural sectors, especially in the services sector, which includes transport and communication, trade, banking, insurance, rents, and social services.

The initial government effort to promote better health was marked by the special campaign of the malaria eradication program, part of a global program promoted by the World Health Organization (WHO). This was followed by yaws and later smallpox eradication in the early period after independence, though some of these programs were effective only in Java and Bali; in some other islands the problems persisted (Mitchell, 1982; and Hugo, 1987).

The government health promotion program started to reach other islands only after the introduction of primary health care throughout Indonesia. The program began in the second half of the first Five-Year Development Plan (*Rencana Pembangunan Lima Tahun* or *Repelita*) in 1969-1974 period. This program is an expansion to a wider network of maternal and child health centres (*Balai Kesehatan Ibu dan Anak* or *BKIA*), which was supported by UNICEF in the 1950s and 1960s periods (Hugo, 1987: 110).

The success of this program led the government to introduce the community health centre (*Pusat Kesehatan Masyarakat* or *Puskesmas*) system. *BKIA* incorporated general outpatients' clinics, family planning services, health education program, and other preventive and curative services (Hugo, 1987: 110).

The establishment of *Puskesmas* in all subdistricts in Indonesia was achieved during the second Five-Year Development Plan of 1974-1979 (Iskandar, 1981). However, because of the unbalanced distribution of doctors in Indonesia, in 1980 about half of the *Puskesmas* had no physicians, despite the fact that the number of doctors in Indonesia was about twice the number of *Puskesmas*.

Puskesmas were initially under-used, especially by the poor people. A number of reasons may be related to this under-use, such as

> traditional beliefs as to the aetiology of diseases which lead to the demand for traditional medicine, particularly for certain types of affliction; cost and traveling time to go to the clinic; attitudes of modern health personnel which discourage less-educated clients from seeking help or advice; and the irregular and inadequate supply of medicines to the centres (Iskandar, 1981; Mitchell, 1982; and Berman, 1984; as cited in Hugo, 1987: 112)

However, *Puskesmas* gradually gained popularity among the people (Hugo, 1987:112). In North Sumatra there was an improvement in health indicators from 1979 to 1990, as there has been a substantial increase in the number of health facilities and medical personnel.

Table 2.4. below shows the trends for health facilities such as hospitals, community health centres or *Puskemas*, dispensaries, physicians, and para-medical personnel (nurses, and midwives).

Table 2.4. The number and ratio of health facility and personnel in North Sumatra: 1979-1990

Health facility or personnel	Quantity 1979	1990	Ratio per one million people 1979	1990
Hospitals	35	87	4	8
Puskesmas	218	300	26	29
Dispensaries	136	288	16	28
Physicians [a]	497	761	60	74
Midwives	940	1636	115	160
Paramedical	1334	6153	163	600

Source : Kantor Statistik Sumut (1991a: 98)
Note : [a] includes general practitioners and specialists

From Table 2.4. it can be seen that between 1979 and 1990 the number of hospitals and dispensaries more than doubled; there were also increases in the ratios per one million people. The increase in the number of physicians was not as high as the increase in midwives or paramedics.

At the village level, midwives and paramedics are important in promoting immunisation in Indonesia. Hugo et al. (1987: 113) state that together with Integrated Service Posts (*Posyandu*), trained midwives play an important role to increase the coverage of immunisation. They admit that this is one of the most important health priorities in Indonesia.

Most of the paramedics work in the *Puskesmas*, where according to the government authority in North Sumatra, there are more paramedics than in other units. The distribution of the paramedics in 1989/1990 was about 48.2

per cent in *Puskesmas*, 39.3 per cent in hospitals, and 12.4 per cent in other units.

The paramedics and midwives in *Puskesmas* are also responsible for running the integrated service post (*Pos Pelayanan Terpadu* or *Posyandu*). This is a program extended from the previous weighing posts, and launched by the government in 1984.

Posyandu aims at integrating into the weighing post a variety of medical services such as vaccination and promotion of good nutrition. The number of *Posyandu* in North Sumatra also increased enormously. Between 1986 and 1989, for instance, the number increased from 3,679 to 15,855 (Kanwil Depkes Sumut, 1990: 24).

2.5. Age at marriage, contraceptive use, and fertility

This section describes the change in fertility levels in North Sumatra and two of the direct determinants: age at marriage and contraceptive use. Their trends in the past are briefly discussed.

2.5.1. Trends in age at marriage

Marriage is still regarded as one of the most important events in human life by most ethnic groups in Indonesia. Most importantly, marriage is not just seen as formal living together, but also as the socially acceptable form of sexual union.

Hugo et al. (1987: 160) note that 'customs and regulations related to marriage vary greatly among the hundreds of ethnic groups in Indonesia'.

In some parts of Indonesia child marriage was practised in the past, but, in the early years of the twentieth century the Dutch colonial government campaigned against it (Hugo, 1987: 162). This had an effect in the areas where the colonial government had a strong influence such as in Java, North Sulawesi, and North Sumatra (Hugo, 1987). North Sumatra was strongly influenced by the Dutch colonial rule because, as mentioned earlier, the Dutch had developed modern plantations in the area.

In other parts of Indonesia, especially in the predominantly Muslim areas, the effect of the campaign was not clear. However, it is known that the age at entry to marriage was still low in some parts of Indonesia in the 1970s. This is indicated by the bitter arguments among some of the Muslim societies and the Indonesian Government before the introduction of the 1974 marriage law which set the minimum legal age for marriage at 16 years for women and 19 years for men. The law also established stricter conditions for both divorce and polygyny.

Table 2.5. Trends in singulate mean age at marriage of women in North Sumatra, and other regions: 1964-1990

Region	Mean age at first marriage			
	1964	1971	1980	1990
North Sumatra	-	20.8	21.7	23.3
Sumatra *)	19.9	19.9	20.6	22.1
Java	18.1	18.7	19.5	21.1
Indonesia	-	19.3	20.0	21.6

Source: Hull and Hatmadji (1992): calculations based on the results of the 1964 Sample Survey and Population Census 1971, and 1980 as cited in Jones (1994); 1990 figures calculated by Jones (1994: 80)

*) includes North Sumatra

Sumatra. Ideally, the comparison should be made with the rest of Sumatra, since North Sumatra's population comprises a large part of the total Sumatra population. Unfortunately, the data are not available. The levels in the province are also higher than the national levels in 1971, 1980, and 1990 respectively. During that period the SMAM in North Sumatra, as in other parts of Indonesia, had shown an increase of about one year for every ten year period.

This increase may be related to the promotion of education for women through compulsory primary education, and other factors. By completing a primary school, a girl will more likely to continue to secondary school. This is related to the fact that there is an increasing demand of female workers, the higher their education level, the higher the salary they can expect. This eventually is related to the delay of age of marriage. Among the ethnic groups in North Sumatra such as the Batak, Malays, Javanese, and Chinese, arranged marriage for very young couples is no longer widely practised (Singarimbun, 1965; Hassan, 1980; and Bangun, 1995).

2.5.2. Trends in contraceptive use

The Indonesian government program of family planning was first introduced in North Sumatra in 1974, as an expansion of the family planning program introduced in Java and Bali in earlier years. This program covers ten large provinces in outer Java and Bali commonly called '*Luar Jawa-Bali I*' (Outside Java-Bali-I).

Modern contraceptives were provided by the government as part of this program. At first, people were not very enthusiastic, as is indicated by the low number of current users among the eligible couples. The number of eligible couples or couples in their reproductive age (*pasangan usia subur* or *PUS*) is measured by the number of married women in the reproductive ages: 15 to 49 years old. Table 2.6 shows the trends in contraceptive use in North Sumatra from 1974 to 1991.

Table 2.6. Estimated percentage of married women of reproductive age using contraception in North Sumatra, and other regions: 1974-1991

Area	Reference time			
	1974/75[a)]	1979/80[a)]	1985[b)]	1991[c)]
North Sumatra	2	14	30	37
LJB I	2	14	32	44
LJB II	-	3	30	43
Indonesia	13	29	38	50

Source : [a)] BKKBN Monthly statistics, July 1985 (as cited in Hugo, 1987); [b)] Biro Pusat Statistik, (1986); [c)] Central Bureau of Statistics (CBS), (1992).

Note : LJB I/II, *Luar Jawa Bali* I/II or Outer islands I/II.

Sumatra had been about the same as the average in Outer Islands I and II. However, compared to the national level, the level of contraceptive use in North Sumatra is still considered low.

2.5.3. Trends in fertility

In the late 1960s, the fertility level in North Sumatra was very high by Indonesian standards, or by any standards. In the period 1967-1970, the Total Fertility Rate (TFR) in North Sumatra was about 7.2 births per woman, much higher than the national level of 5.6. It was believed that the high level in North Sumatra would remain unchanged for quite a long time, because most of the ethnic groups living in the province, such as the Batak, Malays, and the Javanese, traditionally preferred extended or large families.

However, there has been a substantial decline in fertility since 1970s in this province. The results of the 1990 Census show that the TFR in North Sumatra is 4.2 per woman. Table 2.7 shows the trends, pattern and levels of fertility in the province since the 1960s.

Table 2.7. Trend, pattern and levels of total fertility rate, North Sumatra: 1968 - 1987

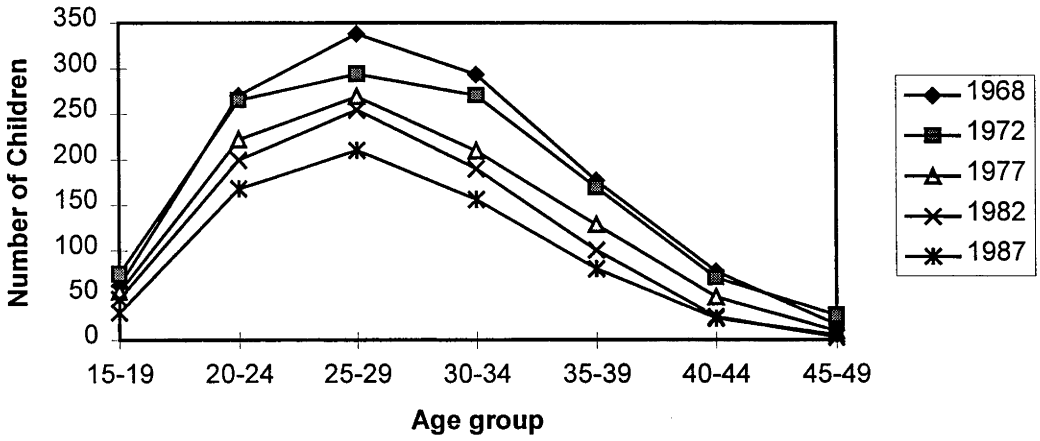
Region / year	Age Specific Fertility Rate							TFR
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	
Urban:								
1967-70	61	270	338	293	177	76	17	6.160
1971-75	74	265	294	270	169	69	28	5.845
1976-79	54	222	269	209	128	48	10	4.700
1981-84	46	199	254	190	100	26	3	4.090
1986-89	31	168	210	156	79	24	6	3.367
Rural:								
1967-70	147	348	355	307	202	98	34	7.455
1971-75	124	341	330	289	192	96	32	7.020
1976-79	101	309	326	268	170	81	24	6.395
1981-84	97	292	299	230	136	54	15	5.615
1986-89	59	243	261	210	131	55	15	4.868
Total:								
1967-70	129	333	351	304	197	94	31	7.195
1971-75	111	320	321	285	187	90	31	6.725
1976-79	87	285	310	253	159	73	20	5.935
1981-84	79	261	284	218	126	45	12	5.125
1986-89	47	212	241	190	112	44	12	4.289

Source : Biro Pusat Statistik (1994).

The table shows that from 1967 to 1990, fertility declined both in rural and in urban areas. The pace of the decline was faster in urban areas than in rural areas. Interestingly, fertility levels declined in all age groups. Fertility control seems to have played a role across all ages of women in reproductive ages. It seems undeniable that the family planning program has had considerable success in this province.

The pattern of age specific fertility in North Sumatra can be seen in Figure 2.1; it has not changed much in more than two decades. However, as mentioned earlier, the decline has occurred across all age groups. The pattern is similar in rural and urban areas (see Table 2.7 for details).

Figure 2.1. Trend and pattern of fertility, North Sumatra: 1967-1990



Source: Biro Pusat Statistik (1994).

2.6. Study analytical framework and the conditions in North Sumatra

In general, the culture in North Sumatra is part of Indonesian culture, or other similar Asian culture. It is characterised by extended family norm and strong kinship relationship. However, the improvement of better education, and the introduction of religious teachings, such as Islam and Christianity into the people who live in different living environment create different sub-cultures.

This study examines how those factors relate to fertility decline. Fertility decline that causes smaller number of children in a family is contrary to the extended family norm widely practiced in the society, especially in North Sumatra. This fact shows that there is a likelihood showing that extended family norm has changed which extent will be observed further in this study.

This study is based on the hypothesis there a variation in the decline of fertility. Group pressures, parent's influence, family planning programs, education, socio-economic conditions, and geographic settings are believed to be related to the decline of fertility in North Sumatra. In this study, those factors are grouped into three: ethnicity, education for women, and geograhic areas. The ethnicity includes ethnic characteristics that include religion, social and kinship system which is expected to indicate the variation of group pressures and parent's influence to the family life. Education for women is expected to show the variation of family planning acceptance degree, because of the negative relationship between education and fertility. Sub-provincial region in North Sumatra is an indicator for variation of geographic, socio-economic conditions and variation of family planning services.

2.7. Conclusion

The North Sumatra population consists of different ethnic groups and has a unique history inherited from the Dutch colonial government, which through its plantation development in the early twentieth century attracted Chinese labourers and moved people from Java to work in the new plantations. Those people resided mostly in the east coast of North Sumatra which was known as East Sumatra. Nowadays, the population in North Sumatra is a mixture of the indigenous people and the descendants of plantation workers from Java and some Chinese.

The demographic characteristics of the people in North Sumatra show important changes over time. The population increased from 4.96 million in 1961 to 10.25 million in 1990, owing to the high growth rates in the periods 1961-1971 and 1971-1980. During those two periods the population growth rates were about 2.9 and 2.6 per cent annually. However the rate had declined to 2.1 per annum in 1980-1990 period (BPS, 1993:17).

The drop in the growth rate is related to the decline in fertility, the introduction of the family planning programme, and the increase in contraceptive use; it is also in accordance with the socio-economic development in the province. Factors like compulsory education, improvements in education, implementation of the marriage law and the high growth of modern economic sectors increased the age at first marriage for both men and women.

The socio-economic growth, however, was not equally distributed in all regions in North Sumatra. The areas that had been developed in the past by the Dutch colonial planters and government enjoyed fast economic growth; in other parts the growth was slower. This has created unbalanced development in the regions of the province. The North Sumatra government divides the province into four regions based on economic performance in the past. This is to give proper attention to all regions in the province. It is interesting to see whether the levels of economic development of regions also affect demographic performance, especially fertility.

CHAPTER 3

DATA SOURCES AND METHODOLOGY

3.1. Introduction

Two main issues are discussed in this chapter: (1) data sources, quality of data and variables used, and (2) methods of analysis. The primary data used in this study are the 1980 and 1990 Indonesian population censuses, the five per cent samples. The five per cent samples of the households from the censuses provide sufficient cases to represent the population, and to a certain level they represent sub-populations.

However, some sub-populations have such a small number of cases that fertility levels cannot be estimated; these sub-populations are not included in the analysis. Attention should also be paid to the quality of data and the reliability and validity of the selected variables used in this study. The discussion of data quality focuses primarily on fertility, which is measured through the reports of births one year before the census to women with different socio-economic and cultural backgrounds.

3.2. Sources and Quality of Data

The advantages of using census data in this study are the large number of cases; the ability to obtain estimates of fertility at the provincial, and sub-provincial levels; and the capacity to analyse fertility determinants at sub-

provincial levels. Fertility trends can be examined by using two population censuses. However, there are also disadvantages in census data compared to other sources of population information. Population censuses collect different information from that obtained in population surveys: the scope of population censuses is usually much wider than that of population surveys, such as the Demographic and Health Survey or the World Fertility Survey. These surveys are especially designed to provide detailed information on fertility and mortality, however, they are also limited in size. The main focus of this study is to analyse fertility levels, trends and determinants at the provincial and sub provincial levels, so a collection with a large number of cases is required. Census data meet this requirement better than population surveys which provide much smaller numbers of cases.

There are two types of data from the 1980 and 1990 Indonesian Population Censuses: the complete enumeration data, and the five per cent sample survey data. The former is a complete enumeration of households from which principal demographic data were collected. As an example, for the 1980 Census, questions about name, relationship with head of household, sex, marital status, age, citizenship, religion, and schooling status for children aged 7-12 years old were included in the complete enumeration. In addition, a question on the type of disability was asked for households where one or more of the members was disabled. Questions about land and land use were asked in the households that lived mostly on agricultural production. The five per cent sample of the complete enumeration collected detailed information about households and

household members (Poedjastoeti, 1983: 12-14). The question on date of last birth was included in the five per cent sample, and consequently this study uses this data source.

Factors that may affect the reliability of fertility analysis in this study are age misreporting of women aged 15 to 49 and the reporting of number of children born one year before the census. Age misreporting or age heaping affected by digit preference is among the common problems encountered in censuses conducted in developing countries. Age digit preference, especially for numbers ending in nought or five, normally occurs in the single-year age data. This will affect quite substantially the results of fertility estimates if single-year data are used. In the estimation of fertility levels and trends in this study, however, grouping ages into five-year age groups will reduce the effect of age heaping.

There are inherent problems that cause misreporting of live births in any population census or survey. One problem is the under reporting of live births where the child died shortly after birth especially where the birth was not attended by medical personnel. It is difficult for mothers to distinguish between a stillbirth and a live birth of a baby that died shortly after the birth, especially if the birth occurred quite some time in the past. This problem is inherent in 'children ever born' data and is commonly found in developing countries (Dasvarma and Hull, 1984). Little can be done to overcome this problem at the data analysis stage. A second problem is the existence of last births for which

the date was not stated. Some adjustment can be made for this problem as discussed later in this chapter.

The 1980 Indonesian population census (five per cent sample) was conducted during the period from 6 October 1980 to 31 October 1980. The 1990 census was also conducted in the same month, October, 1990 in a slightly different period, 12 to 31 October (Poedjastoeti, 1983; Biro Pusat Statistik, 1992). Having relatively the same dates of survey, the two censuses will produce approximately the same annual estimation period of births in a year before the survey. However, some adjustment still needs to be done to obtain approximately the same time.

3.3. Selection of variables

The variables used in this study are social, economic, and cultural variables. The variables are indicators of the related context; therefore, careful selection and observation of them are important . The variables are selected on the basis of two considerations: that they are proper indicators of the social, economic, and cultural context; and that they are comparable for the 1980 census and 1990 census data.

Social variables included in this study are level of completed education, and place of residence. Ethnic identity is used as the indicator of culture. As mentioned in Chapter 1, social and economic development in North Sumatra has been recorded in four regions in the province because those regions are at different development stages: some have developed faster than others. These

development disparities mean that each region is at a different stage of social and economic development: in a more developed region, there is more information, better health facilities, and better communication. This eventually affects fertility or fertility behaviour. It is assumed that the more developed a region, the lower the fertility. The stages of development of the region are determined through social and economic indicators.

3.4. Sampling procedures

The Indonesian Bureau of Statistics conducted the Censuses by subdividing the whole area of Indonesia into what are called Enumeration Areas (EAs) and Census Blocks (CBs). This division is important not only for the sake of conducting censuses but also for subsequent surveys that are normally conducted between censuses. Therefore an Enumeration Area should have clear and permanent or natural boundaries. The number of households in an Enumeration Area is dependent upon the land area, and, most importantly, it should take approximately two weeks to finish the enumeration. Accordingly, the average Enumeration Area is 200 households but the number varies from much lower than 200 households in sparsely populated areas to about 300 in densely populated areas.

However, because of variation in size and land area, Enumeration Areas are not appropriate for use as the lowest sampling unit. On the other hand, the household unit is also impracticable as the lowest sampling unit considering overall cost and practicality in the field execution. Therefore, Biro Pusat Statistik (Central Bureau of Statistics) set up the lowest sampling unit between

the Enumeration Area and the household unit. This unit is called the Census Block. The Census Blocks were formed to minimise sampling variation; the number of households in each CB does not exceed 100, and the CB has to have clear and permanent boundaries.

BPS also set up the following rules in selecting the sample (Poedjastoeti, 1983: 9-10):

1. Each regency or municipality was considered to be an estimation area.
2. In every regency or municipality two strata were formed, one for urban areas and one for rural areas
3. All of the villages in each stratum were ordered according to their location, starting from the village which was located in the south-west corner
4. Five per cent of the ordinary CBs were collected from each stratum. Special CBs (with relatively homogeneous populations such as military barracks, dormitories, hospitals, prisons) were not included in the sample because they formed a separate stratum. Ordinary CBs were collected systematically with a random start, and all households in the selected CBs were enumerated

Furthermore, BPS also arranged four different sampling schemes based on the estimate of the total size of population required in the sample. The four different sampling schemes were as follows:

1. *Rural sampling scheme for ordinary CBs in regencies or municipalities*
   Subdistricts were ordered according to their geographical location starting from the southwest corner. Within each subdistrict, villages were also ordered according to their geographical location. Finally five per cent of the CBs were selected from this frame using systematic sampling with a random start.
2. *Urban sampling scheme for ordinary CBs in regencies*

Towns were ordered by their population size. Within each town the urban villages were ordered on the basis of their geographical location. In each selected village, five per cent of the CBs were selected using systematic sampling with a random start.

3. *Urban sampling scheme for ordinary CBs in municipalities*
   The CBs in urban villages were ordered in a circular fashion starting from the centre of the city. Five per cent of the CBs were selected using systematic sampling with a random start.
4. *Sampling scheme for special CBs*
   All special CBs were included in the sample as a separate category. Five per cent of the households were selected from each block. This method was used with the assumption that special CBs were not numerous and the residents have similar individual characteristics

3.5. Methods of Analysis

In the following section, methods and assumptions used in the analysis are discussed. Subsections deal with census questions, assumptions, denominators and numerators of fertility rates, calculation of age specific fertility rates and total fertility rate, and I_f, I_g, and I_m Coale indices. It is necessary to compare questions of the 1980 and 1990 censuses related to the last-born child, and social and economic indicators, to make sure there will be no substantial contextual differences in the two questions that make comparison between them impossible. One of the central assumptions in this analysis is that there is no ex-nuptial fertility; this is discussed below. Some necessary adjustments to the denominators and numerators were also performed, to estimate reliable age specific fertility rates and total fertility rates and to provide Coale indices, which are used in the study to evaluate the extent and nature of change in fertility in the society.

3.5.1. Census Questions

The question about or related to children ever born in the 1980 and 1990 Censuses was asked of ever-married women only. In the 1980 Census, it was asked in Section IX*: 'Untuk wanita yang sudah/pernah kawin'* (for currently married or ever married women) (see McDonald, 1983, appendix). This section has seven questions, from Question 43 to Question 49 in the sample survey questionnaire. Question 48 in this section is : *'bulan dan tahun kelahiran anak yang terakhir,* followed by *bulan:..... tahun: 19.....'* (month and year of birth of the last-born child, followed by month:..... year:.....). This question is used to obtain the number of children born in the last 12 months according to the ages of their mothers.

The corresponding section in the 1990 census is : 'VIII. *Wanita yang berstatus kawin, cerai hidup atau cerai mati*' (women with marital status: married, divorced, or widowed). The comparable question was asked in Question 45: *'bulan dan tahun kelahiran anak lahir hidup terakhir'*, followed by month and year column (month and year of last live birth). The specification of live birth was not used in the 1980 census question; there is some possibility, therefore, that responses to the 1980 question could also include still-births. No correction can be made for this possibility. Overall, however, the questions on last-born child in the 1980 and 1990 censuses are substantially the same and the target of the question was also the same, namely ever married women.

3.5.2. Assumption of no ex-nuptial fertility

In this analysis, ex-nuptial fertility is assumed to be zero, for two reasons: first, no information about ex-nuptial births is obtained in the Indonesian censuses. Secondly, ex-nuptial births are not socially and culturally accepted by most of Indonesian society. Therefore, except in parts of big cities where social control is barely existent, the number of ex-nuptial births is likely to be negligible. While there are no official figures to verify this statement, the following personal observations indicate practices in Indonesian society, especially in North Sumatra. If a girl or a single woman is pregnant, normally she has two choices: to tell her parents, or to solve the problem by herself or with the father of the unborn child. Most often, she will choose the second alternative, because it is shameful and socially unacceptable to have an ex-nuptial pregnancy. In this instance, she has only two choices, to get married soon with or without her parents' consent, or to have an illegal induced abortion.

If a girl or woman chooses the first alternative, the parents are likely to take one of the following actions: to give her up, not allowing her to live with them; to hide with a relative who lives far away from their home; to arrange a marriage with the father of the unborn child, or if he is not known, to find a man who will marry her; or to help her to have an induced abortion. The most likely of these to happen is for the parents to arrange a hideaway until the baby is born. However, the number of these cases is very small.

The practice of the illegal abortion in North Sumatra was observed in my fieldwork. I interviewed a medical doctor in North Sumatra whose institution

provides medically induced abortions. I observed that the demand for induced abortion has increased quite remarkably in the past decade. This is indicated not only by the doctor's records, but also by the growth of his institution in the smaller towns. He said that most of his patients are married women who had unwanted pregnancies; but he had also helped single women in some cases. His institution is one of the places where women with ex-nuptial pregnancies seek help. Also, there are quite a number of traditional birth attendants (*dukun bayi*) who practise abortion. They are not only much cheaper, but also much easier to contact confidentially. In summary, while some ex-nuptial births will be missed in the analysis, the numbers are likely to be very small for any subgroup.

3.5.3. Data adjustment

Adjustments to the recorded census data in this study are required. The adjustments apply to both the numerators (births) and the denominators (women) used in the calculation of the age specific fertility rates in the period 12 months before the censuses. The number of births 12 months before the census needs to be adjusted for the number of cases where the date of last birth was not stated. The number of births in the previous twelve-month period will include a proportion of these non-stated cases. The cases include those who did not state the month of their last born child and those who did not state the year.

3.5.3.1. Denominator

In this study, the age groups used for analysis are of women aged 15 to 49 years. The information on total numbers of women by age in a census is obtained at the date of the census. There is a different time reference between the 1980 and 1990 censuses. In the 1980 Indonesian census, the total number of women refers to a period from 6 October 1980 to 31 October 1980, while in the 1990 census it refers to a period from 12 October 1990 to 31 October 1990. The births in the numerator refer to the 12 month period immediately before the census. Because of this, the total number of women in five-year age groups to be used in the denominators must refer to the mid point of this 12 month period. This period is on average six months before the census. The following formula is applied to both the 1980 and 1990 censuses to obtain the adjusted number of women in age group 15-19. A similar formula is used to adjust other age groups.

$$W_{15\text{-}19} = 0.5\ (W_{15}) + W_{16} + W_{17} + W_{18} + W_{19} + 0.5\ (W_{20})$$

Where:
W_n = number of women aged n at the census date

3.5.3.2. Numerators

Using the month and years of last birth, the number of births to women in various age groups in the twelve-month period immediately preceding the census dates can be obtained. Again, the ages of mothers have to be reduced by half a year on average as was the case for the denominators. Interpolation

was used to deal with the past month, the month of October, twelve months before the censuses.

The total number of births thus obtained does not reflect the real total for several reasons: the reported births do not include the cases where date of last birth is not stated, instances of multiple births (mostly twins) would count as only one birth, and there is no information about penultimate births where there were two confinements in the twelve-month period. Therefore, in this analysis some adjustments are made or assumptions applied to deal with these inaccuracies.

3.5.3.3. Adjusting for month not stated

For the 1980 census, all those who stated that they had their last born child in 1980 are included irrespective of whether the month of birth is stated. The additional number of births to be included in the numerator is a proportion of those who said that they had their last born child in 1979 but did not state the month. The proportion is derived from the days between the mid-period when the census was carried out and the end of the year. The number is 74.5/365 multiplied by the number of births with month not stated in 1979. The same procedure is also applicable to the 1990 Census. The only difference is that the proportion non-stated in 1989 will be 70.5/365 and this is multiplied by the number of births with month not stated in 1989.

In this adjustment, it is assumed that there is no monthly variation of births. Planning of the month of birth is not practised by the people in North Sumatra,

or even in Indonesia. The Chinese in North Sumatra may have fluctuations in their births, but this will have an effect annually rather than monthly, because the Chinese believe that year of birth has a strong relation to fortune and behaviour.

3.5.3.4. Assumption for year not stated

In the data, some last births were reported but with the year of birth not stated. In this study, the number of those cases occurring in the 12 months before the census was assumed to be zero. The reason for this is that a mother who has a memory lapse problem is more likely to be a mother who had her last born child long in the past. Not-stated year of last birth is very unlikely to occur among mothers who had a child in the past 12 months.

3.5.3.5. Adjustment and assumption for twins and penultimate births

Information about twins is not available in the data set. Despite being usually small, the number of cases of twins is not negligible. Therefore, in this study the reported total number of last-born children is multiplied by a standard factor that accounts for the proportion of multiple births (mostly twins). Considering that the proportion of twins in a society is relatively stable, this study uses the proportion of twins observed in the 1976 Indonesia Fertility Survey (CBS, 1978). This proportion was also used by Dasvarma and Hull (1984) in their last live birth estimate for Indonesia based on the published report of the 1980 Indonesian Population Census (CBS, 1978). The above adjustment is particularly relevant in the estimate of fertility levels. In other types of analysis in this study, such as comparison of fertility levels among sub-populations, the

adjustment will make little difference because all estimates are multiplied by the same figure (proportion of twins).

In this study, no adjustment is made for the possibility of two confinements in a single 12-month period, because the correction factor is too small to warrant its use.

3.5.4. Estimation of age specific fertility rates and total fertility rates

This study uses direct estimation of TFR and ASFR from the last live births information in census data similar to the last live birth method used by Dasvarma and Hull (1984). However, there is a major difference between the two studies. The number of births used in this study is the total births within the period 12 months before the census. In the Dasvarma and Hull study, the number of births used is the number of births in the year of the census. They use an example of the year 1980. Therefore, they need to adjust the number of births for the rest of the 12-month period. The total number of births in this study is more reliable because it is based on a full 12 months of data from raw data. Using raw data from the original tapes allows more control of data analysis. This study, accordingly, uses actual number of births, instead of an estimation.

The P/F ratio method and the Relational Gompertz model to adjust fertility have not been applied in this study. An examination of results of a P/F ratio analysis was conducted but these results were not considered to contribute anything of value to the census results. These methods are applicable to poor quality data

but, for two reasons, the basic data used in this study appear to be of good quality. First, North Sumatra has relatively high education levels; second, there is now a long experience of conducting modern censuses. For these reasons, the adjustment of TFR with the P/F ratio is considered not to be necessary. Age specific fertility rates and total fertility rates for the period between 1980 and 1990 were also estimated from the changes in mean numbers of children ever born for age cohorts. These results show the pattern and level of fertility approximately in 1985. While the total fertility rates thus obtained were consistent with the results for 1980 and 1990 from the last live birth method, the age patterns of fertility were not consistent. Because of this, these decade estimates were not used because the last birth method was much more likely to provide a reliable age pattern of fertility.

3.5.5. I_f, I_g, and I_m indices

The change in fertility levels is observed by describing the differences in levels according to socio-economic criteria at two times: 1980 and 1990. Further details of the change are analysed by using the Coale Indices (Coale, 1965), which have been used widely as an analytical tool of fertility change. The indices use a standard or maximum-fertility schedule, in this case, the highest fertility schedule ever reliably recorded: fertility among married Hutterite women during 1921-1930 (Henry, 1961). There are three types of indices: I_f , the index of overall fertility, I_g, the index of the fertility of married women, and I_m, the index of the proportion married. Coale (1965: 205-206) defines the indices as follows:

The index of overall fertility is the ratio of the observed number of births in the given population to the number that would occur if women in every age interval had experienced the standard or maximum fertility schedule.
The index of marital fertility is the ratio of the number of births occurring to married women to the number that would occur if married women experienced the standard fertility schedule.
The index of the proportion married (among women of child bearing age) takes a form directly related to fertility; it is the ratio of the number all women would bear if subject to the standard schedule. It is a weighted index of proportion married, with a large weight being given to married women who are in the most fertile years, and a small weight to married women above age 40

The overall fertility index, I_f, is used to measure the extent of fertility change in the society. The change in Ig will reflect the change in marital fertility in the society. The practice of family size control can be inferred through this index.

Finally, I_m indicates the extent to which changes in the proportion married may have affected overall fertility. Proportions married are primarily influenced by changes in age at first marriage. The formulae of the indices are as follows:

$$I_g = \Sigma g_i m_i / \Sigma F_i m_i \qquad (1)$$

$$I_m = \Sigma F_i m_i / \Sigma F_i w_i \qquad (2)$$

As mentioned earlier, the ex-nuptial births are assumed to be zero, accordingly the following equation can be derived:

$$I_f = I_g \times I_m \qquad (3)$$

where:
g_i = Births per married woman in i^{th} age interval
F_i = Births per married woman in i^{th} age interval in the standard population (married Hutterites, 1921 - 1930)
m_i = Number of married women in i^{th} age interval
w_i = Number of women in i^{th} age interval

The standard schedule of births can be seen in Table 3.1:

Table 3.1. Standard schedule of births per woman in each age group

Age groups	15-19	20-24	25-29	30-34	35-39	40-44	45-49
Births	0.300	0.550	0.502	0.447	0.406	0.222	0.061

Source: Coale, 1965: 209

Because the indices are interrelated (see equation 3), the equation can be mathematically decomposed into components of difference. These components of difference can be used to explain the contribution of each index to the change of fertility. [1]

The interrelation of the indices can be expressed as follows:

$I_f^{80} - I_f^{90} = ((I_g^{80} + I_g^{90}):2)\ \Delta\ I_m + ((I_m^{80} + I_m^{90}):2)\ \Delta\ I_g$

where:

$\Delta\ I_m = I_m^{80} - I_m^{90}$ and $\Delta\ I_g = I_g^{80} - I_g^{90}$

This equation expresses the change in I_f from 1980 to 1990 ($I_f^{80} - I_f^{90}$) in terms of the changes in I_m and I_g. This enables us to interpret the change of overall

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[1] Components of difference:

Writing $I_f = F$, $I_m = M$, $I_g = G$, then $F = M.G$ or

at time 1

$F_1 = M_1 . G_1$ and

at time 2:

$F_2 = M_2 . G_2$

Let $\Delta F = F_1 - F_2$

$\Delta M = M_1 - M_2$

$\Delta G = G_1 - G_2$

Then

$\Delta F = M_1G_1 - M_2G_2$ (3)

$= M_1G_1 - (M_1 - \Delta M)(G_1 - \Delta G)$

$= M_1G_1 - (M_1G_1 - \Delta MG_1 - \Delta G M_1 + \Delta M \Delta G)$

$= M_1G_1 - M_1G_1 + \Delta M G_1 + \Delta G M_1 - \Delta M \Delta G$ (4)

Also

$\Delta F = (\Delta M + M_2)(\Delta G + G_2) - M_2G_2$

$= \Delta M \Delta G + M_2 \Delta G + G_2 \Delta M + M_2 G_2 - M_2G_2$

$= \Delta G M_2 + \Delta M G_2 + \Delta M \Delta G$ (5)

$2 \Delta F = \Delta M G_1 + \Delta M G_2 + \Delta G M_1 + \Delta G M_2$ (4) + (5)

Hence $\Delta F = ((G_1+G_2):2)\ \Delta M + ((M_1+M_2):2)\ \Delta G$

fertility in terms of the change in marriage-related factors as indicated through the change in I_m or through marital fertility as indicated through the change in I_g.

3.6. Secondary and Qualitative data

To support findings of the census data analysis, secondary and qualitative data were collected. The information obtained from secondary data is the information on any demographic, social and economic condition prior to the 1980 census or between 1980 and 1990 censuses. While qualitative data are related to qualitative information on the changing fertility behaviour.

The secondary data collected were published materials from government authorities, or other relevant studies from any research institution in Indonesia. While qualitative information, which was collected through in-depth interviews with selected key persons and selected women, was carried out during field study. Furthermore, any material related to the progress and development of government family planning programs in the province and sub-province regions will help to explain fertility differentials in this study. Other information such as research on ethnic identity in North Sumatra was also collected.

3.6.1. Purpose of the fieldwork

The findings of demographic data analysis in this study can be more comprehensively explained by obtaining field information on socio-economic development in the study area. Because of this, a relatively short field visit was conducted. The results of the fieldwork are used as complementary information to the findings of the primary data analysis.

3.6.2. Nature of the fieldwork

The fieldwork can be divided into two segments: visits to places where published materials were obtained, interviews mainly in North Sumatra. Published materials related to this study were obtained in central government offices in Jakarta and provincial offices in North Sumatra.

Population research reports are normally available in two main population research centres in Indonesia: the Demographic Institute, Faculty of Economics, University of Indonesia (Jakarta) and the Population Research Centre, Gajah Mada University (Yogyakarta). Those two places were visited during the fieldwork and material relating to the study was obtained from the libraries of these centres.

The Biro Pusat Statistik (BPS), the National Family Planning Coordinating Board (BKKBN), and the State Ministry of Population (Kementrian Negara Kependudukan) are government authorities that issue official data or information on family planning programs or population policies in Indonesia. The information provided is at the national and provincial levels. Material relevant to the study was also obtained from these sources.

North Sumatra, as the area of study, was the main focus of fieldwork. In this province fieldwork activity was divided into two categories: collection of secondary and published data, and interviews with informants.

3.6.3. Materials collected in the fieldwork

3.6.3.1. Published and unpublished materials

Government authorities usually publish reports of policies and program implementations on a regular basis, such as yearly, or five-yearly. This study uses these reports as additional information to assist in explaining the results of the census data analysis. Statistical information was obtained from the Central Bureau of Statistics in Jakarta or in Medan, the capital city of North Sumatra.

Relevant research reports from the Demographic Institute of the University of Indonesia, and the Population Research Centre at Gajah Mada provide useful additional materials for the study. Most of the research reports from the centres relate to research in Java, but these reports can be used for comparison with the results of this study.

3.6.3.2. Informal interviews

One informal interview was conducted outside North Sumatra; it related to a general overview of ethnic groups in North Sumatra, and was with a person with great knowledge of population and ethnic groups in North Sumatra. This general information was used to establish a fieldwork strategy in North Sumatra. The information obtained was very useful in the process of collecting data in the field. All other informal interviews were conducted in North Sumatra as described below.

3.6.4. Selection of field study areas

The four main ethnic groups in North Sumatra, Batak Mandailing, Batak Toba, Malays, and Javanese, were the focus of the fieldwork. Considering the time

constraint and issues of practicality, no other ethnic groups were observed in the fieldwork, because not only are other groups relatively small, but also some of them are difficult to approach. The Chinese community in Medan, North Sumatra is one example. In my personal experience, it is difficult to interview this group, which tends to be an exclusive community.

Accordingly, areas were selected where the main four ethnic groups lived. The Malays and the Javanese can be found in *Kabupaten* (regency) Deli Serdang, though not only in this area. Batak Toba and Javanese live in *Kabupaten* Simalungun, while the Batak Mandailing mostly reside in *Kabupaten* Tapanuli Selatan. Hence, these three kabupaten were selected for the conduct of informal interviews.

After the *kabupaten* level was selected, the *kecamatan* (district) level was the next step of area selection. With the assistance of personnel from the BKKBN office, some *kecamatan* were selected where respondents of the selected ethnic groups could be interviewed.

At the kecamatan level, several *Posyandu* (integrated service posts) were selected. The selection of *Posyandu* depended on their schedules of operation (*penimbangan*) so as to match the timing of the fieldwork. The information of *Posyandu penimbangan* schedules was provided by BKKBN midwives who were stationed at the *Kecamatan* office.

3.6.5. Selection of respondents and method of collecting information

3.6.5.1. Key informants

Some key informants were selected in this fieldwork to be interviewed. Some were government authorities who were in charge of family planning and population-related programs and some were academics from University of North Sumatra in Medan. The selection of academics was based on their ethnic background so that they could give information from their real life experiences.

One key informant has a background in anthropology and comes from a Batak Karo family but was raised in a mixed cultural environment. His first language was Javanese when he was a child, because during his childhood he was influenced by his Javanese neighbours on the outskirts of Medan. He was so close to that family, that he feels that he knows and understands Javanese culture. His father and mother were working and his family can be categorised as high socio-economic status.

Another informant is a lecturer in the University of North Sumatra. She comes from a Malay family and is married to a man from the same ethnic group. Another informant has an overseas university background and comes from a Batak Mandailing family; he is married to a Tapanuli Batak woman. He has the opposite background to another key informant who is a Batak Toba woman married to a Mandailing man. Her knowledge of her culture is from her experience of growing up as a Batak Toba woman. She was born in Simalungun regency, the place where Batak Toba and Simalungun, Batak

Karo, and Javanese live together. The last informant is a civil servant in Medan, a North Sumatra Javanese with a high education background.

Other key informants include those who worked in BKKBN, and in the *Posyandu*. I interviewed public servants in Deli Serdang, Simalungun, and South Tapanuli *Kabupaten*, and BKKBN field officers in Percut Sei tuan, Tiga Raja, Hutabayu Raja, and Padang Sidempuan Barat *Kecamatan* (Districts).

3.6.5.2. Selection of women

This fieldwork is also aimed at collecting opinions about changes in fertility. The information collected related to the number of children women had compared to their parents or other relatives in the past. The aim was to obtain ideas about whether the respondents had noticed that there had been a decline in fertility in their society, and to obtain their opinions about the factors associated with it based on the customs practised in the society. A random selection of women present in the *Posyandu* was carried out. Interviews were conducted with both young and old mothers. A young mother is defined as one aged 25 years and below; the other group of women were considered as older mothers.

CHAPTER 4

DOES FERTILITY DECLINE DIFFER BY ETHNIC IDENTITY?

4.1. Introduction

This chapter describes the change fertility levels and trends, and factors underpinning the decline according to ethnicity in North Sumatra. Levels and trends of fertility are indicated through the calculation of Total Fertility Rates in 1980 and 1990. The related factors are defined as marital fertility, and the proportion married. The factors associated with marital fertility are the efforts to limit family size, mostly associated with the use of contraception, both modern and traditional, since other means of limiting family size such as induced abortion or voluntary celibacy are either non-existent or not influential. Induced abortion is illegal in Indonesia and its incidence is relatively low especially among married couples. Changes in proportions married are associated mainly with the change in age at first marriage. Since the age at first marriage is also strongly related to the first birth, its change will have a substantial effect on fertility.

Efforts to limit family size are influenced by social, economic, and cultural values. To examine the role of cultural values on the fertility decline, this chapter observes fertility performance according to ethnic identity. The main ethnic groups in North

Sumatra are the focus of the discussion. The language spoken at home defines ethnic identity. Accordingly, with this categorisation, there are five main ethnic groups observed: foreign, Muslim Batak, Christian Batak, Javanese, and Malay. The foreign group is defined as those who speak a foreign language at home; further investigation shows that this group consists mainly of the Chinese community. For example, the religion of foreign language speakers is mainly Buddhism, known to be the main religion of the Chinese people. Some of them are the descendants of the Chinese plantation workers recruited by the Dutch colonial planters in the early years of the twentieth century.

The Batak are subdivided according to religion because in some cases they have different traditions influenced by religion. The different influences can be related to the timing of first marriage and the use of some particular types of contraception. It was found from the field observation, for instance, that the Christian Batak people had substantially higher rates of sterilisation than the Muslim Batak. Also, among the Muslim Batak people young marriages are more common than among the Christian Batak people.

It is still possible to identify Javanese in North Sumatra through the language spoken at home, because most of the Javanese in North Sumatra still speak Javanese in their daily life. In the field observation, it was also noted that the Javanese still maintain their Javanese culture. However, there are some adaptations that differentiate them from the Javanese who live in Java. The most

noticeable difference is in use of 'the Javanese language'. The Javanese language spoken in North Sumatra differs from the original Javanese in status term and vocabulary. In the original Javanese language, there are at least three levels of language to be used to three different statuses of people. They are the terms used for communication with (1) the common people including siblings, and close friends, (2) more respectful people including parents, older people, or strangers, and (3) the highest level equivalent to the kings or the royal family. Nowadays, the third level of the Javanese language is rarely spoken. In the case of North Sumatra, the spoken Javanese language is mostly the first level language. This makes the language sound impolite if it is spoken to people who come from Java. Besides, the Malay language has influenced the Javanese language spoken in North Sumatra, therefore much of the vocabulary does not even exist in the original Javanese language.

Unlike Javanese, Malay is very similar to Indonesian, some people in North Sumatra think that the two languages are identical and do not distinguish them. Accordingly, many Malays answer the question about language spoken at home as the Indonesian language. In order to identify the Malays, an adjustment is made. According to Sinar (1994), the Malays are followers of Islam. Most of them live in coastal North Sumatra including *Kabupaten* Labuhan Batu, *Kabupaten* Asahan, *Kabupaten* Deli Serdang, *Kabupaten* Langkat, and *Kabupaten* Binjai; therefore the Malays in this study also include Muslim people who speak the Indonesian language in these areas. The area excludes *Kotamadya* Medan to

avoid confusion with other ethnic groups with similar assumed characteristics, since many ethnic groups whose religion is Islam live in *Kotamadya* Medan and speak Indonesian.

4.2. Fertility levels and trends by ethnic groups

Fertility levels and trends are used to observe the change in fertility in a particular period. However, it is important to note that the change in fertility in this particular period is only part of a process that had commenced earlier. Therefore, the levels of fertility found in 1980 can also be seen as indications of processes that had occurred before 1980. This chapter examines the stages of fertility decline of each ethnic group. As discussed in Chapter 3, the level of fertility is measured by the Total Fertility Rate (TFR) using the last live birth method. The period examined in this study is 1980 to 1990.

Table 4.1. Decline in Total Fertility Rates in North Sumatra, 1980-1990, according to ethnicity

Population	TFR		decline
	1980	1990	
Foreign (mostly Chinese)	3.18	2.22	0.96
Muslim Batak	5.45	4.19	1.26
Christian Batak	6.42	4.41	2.01
Javanese	6.43	3.53	2.90
Malays	5.81	3.82	1.99
Total	5.66	3.75	1.91

Source: 1980 and 1990 Census data tapes

Table 4.1 shows that level of fertility varied according to ethnicity. In 1980, the TFR of North Sumatra was about 5.7 while the differentials according to ethnicity

ranged from 3.2 to 6.4 children per woman. Three levels of fertility in 1980 can be seen from the table: high, medium, and low. The ethnic groups with a high level of fertility are the Javanese and Christian Batak, Muslim Batak and Malay fertility are in the medium position, while the Chinese are the only ethnic group that has a low fertility level. Despite the differences in ethnic background, the Javanese and the Christian Batak have similar levels of fertility.

The TFR of the Chinese community was the lowest in the province. From the informal field interviews, it was found that some indigenous people, regardless of their educational background, had the prejudice that the Chinese community had high fertility: it was believed that the Chinese community did not want to participate in the family planning program promoted by the government. However, this study shows that the level of fertility of the Chinese community in North Sumatra is closer to that of the neighbouring countries such as Malaysia than to the other ethnic groups in North Sumatra. In 1983 Saw (1988: 194) found that the TFR of the Chinese population in Malaysia was 2.72 births per woman, which is between the levels of TFR of the Chinese population in North Sumatra between 1980 and 1990. There is an indication that this is due to a possible relationship based on similar ethnic identity. As noted earlier in Chapter 2, the Chinese community in North Sumatra has trade and cultural relationships with Chinese in the neighbouring countries, including Singapore.

The 1980 data suggest that among the indigenous ethnic groups, the Malay and Muslim Batak had experienced fertility decline earlier than the Christian Batak. Chinese fertility apparently declined even earlier. The Javanese, the pre-independence, inter-provincial migrant group, shows very little indication of fertility decline before 1980. Together with the Christian Batak, the Javanese had a TFR of about 6.4 per woman.

By 1990, the relative levels of fertility in North Sumatra had changed from those of 1980. The Chinese ethnic group still had the lowest fertility level among all ethnic groups: it was comparable with the fertility level of Singapore which was 1.8 at that time (see: UNICEF, 1992: 81). This suggests that fertility levels be affected by ethnic backgrounds.

Surprisingly, by 1990, the fertility level of the Javanese had become the second lowest, a substantial change since their level was the highest in 1980. The factors involved in this change are described later in this chapter. In general, this finding shows that there was a dramatic change in social and behavioural attitudes toward fertility among the Javanese people in North Sumatra in the 1980s. Thus, the extent of fertility decline in North Sumatra is found to vary by ethnicity. The overall TFR declined about 1.9 points but the range of the decline is from about 1.0 for the foreign speakers to 2.9 for the Javanese. The Christian Batak had the highest fertility both in 1980 and 1990.

Field observation shows that there are differences in the value of children and sex preferences among the ethnic groups in North Sumatra. The Christian Batak are characterised by a strong preference toward sons: in their culture the role of male children is very important in almost every social and cultural function. This also applies to the Muslim Batak to a more modest extent. Most Batak families will not stop having children if they have not yet had sons. The relationship between religion and ethnicity in this case is not always easy to explain, but, the major difference between the Christian Batak and the Muslim Batak is that the Christian Batak practise their traditional culture more intensively than the Muslim Batak. One of the reasons for this is that their traditional culture has no major conflict with Christian teachings. Consequently, kinship ties among the members of the ethnic group remain strong and the older generation and cultural leaders are still very important in maintaining cultural practices.

Fieldwork and personal observation showed that the Javanese ethnic group, including those in North Sumatra, have no child sex preference. Based on personal observation in the field, Javanese people are happy to have children regardless of the sex, because there is no special role for sons in traditional and cultural functions among the Javanese as is found in the Batak ethnic groups. The Javanese are more like the Malays than other ethnic societies. However, unlike the Javanese in North Sumatra, the Malays still recognise a royal family kinship system. The members of the royal family usually are also the cultural and traditional leaders.

For the particular period observed, the Javanese had the largest decline in fertility and the process of fertility decline occurred mostly during that time. They are followed by the Malay, the Christian Batak, and Muslim Batak at a lower pace of decline. Naturally, the Chinese fertility level had the smallest decline, because it was already low in 1980. In that period, the Christian Batak had experienced fertility decline faster than the Muslim Batak. One of the explanations is based on field observation: the Christian Batak people had a higher rate of permanent contraceptive use (sterilisation) than other ethnic groups, including Muslim Batak. Further quantitative explanation is given later in this chapter.

Another way to explain the change in overall fertility is by using the Coale Indices as the indicator. The Coale index that shows overall fertility change is If. Table 4.2. shows this index according to ethnicity in 1980 and 1990, and the change during that period. The table shows that in 1980, the Javanese had the highest level of I_f. This is consistent with the previous finding showing the high level of the total fertility rate for this group in 1980.

Table 4.2. The change overall fertility as indicated by the change in If

Population	I_f Index		changes in If
	1980	1990	
Foreign	0.24	0.18	0.05
Muslim Batak	0.40	0.32	0.08
Christian Batak	0.46	0.32	0.13
Javanese	0.50	0.29	0.21
Malays	0.48	0.37	0.12
Total	0.42	0.28	0.14

Source: Indonesia Population Census data tape 1980-1990

Some of the other ethnic groups have I_f levels similar to those of some countries in the pre-transition stage of fertility. European Russia in 1930, Bulgaria in 1900, Taiwan in 1956 and Mexico in 1960 had levels of I_f of 0.42, 0.52, 0.50, and 0.50 respectively (Coale, 1965: 209). This indicates that except the Chinese, all ethnic groups showed little fertility decline before 1980.

I_f values for the Chinese ethnic group show that there had been a fertility decline before 1980. In 1980, the stage of the decline was even lower than that of Taiwan in 1960 and it is comparable with the levels of fertility in some Western European countries such as Norway, England and Wales, and France in 1960.

Within the ten-year period, I_f declined substantially in all ethnic groups. In 1990 the highest level of I_f was 0.37 which is comparable to the level of the same index in Japan in 1930, while the lowest was 0.18 which is comparable to the level of the same index in Japan in 1960 or Sweden in the same year. This means that in a ten-year period, some ethnic groups in North Sumatra experienced the fertility decline that some European and Asian countries needed 30 years or more to complete.

The change in I_f shows the speed of the change. The Javanese is the ethnic group that had the fastest decline, while the Chinese ethnic group experienced the least decline. As mentioned above, this observed period is part of the process which began earlier. Some ethnic groups that had little or no decline before the 1980s

experienced substantial decline during the observed period while the ethnic groups that had small changes of fertility may have begun the decline earlier.

4.3. Age fertility patterns by ethnic groups

The fertility pattern is measured by Age Specific Fertility Rates (ASFR). The fertility schedule shown by the age specific fertility rate indicates the average timing of childbearing occurring in a group of women. Shryock and Siegel (1971), using data from various countries, found the striking fact that the age patterns of fertility are very similar from one country to another. The similarity is even more obvious if the fertility schedule is converted to percentages. This indicates that the pattern is more related to biological factors than to the social and economic factors. This can also be related to the limits of the childbearing capability of women: in almost all societies, very young or old women are regarded as not in the prime time to have children. Nevertheless, the age pattern of fertility does vary across cultures with levels at the younger ages being related to the age at which regular sexual relations are commenced and levels at older ages being related to use of contraception.

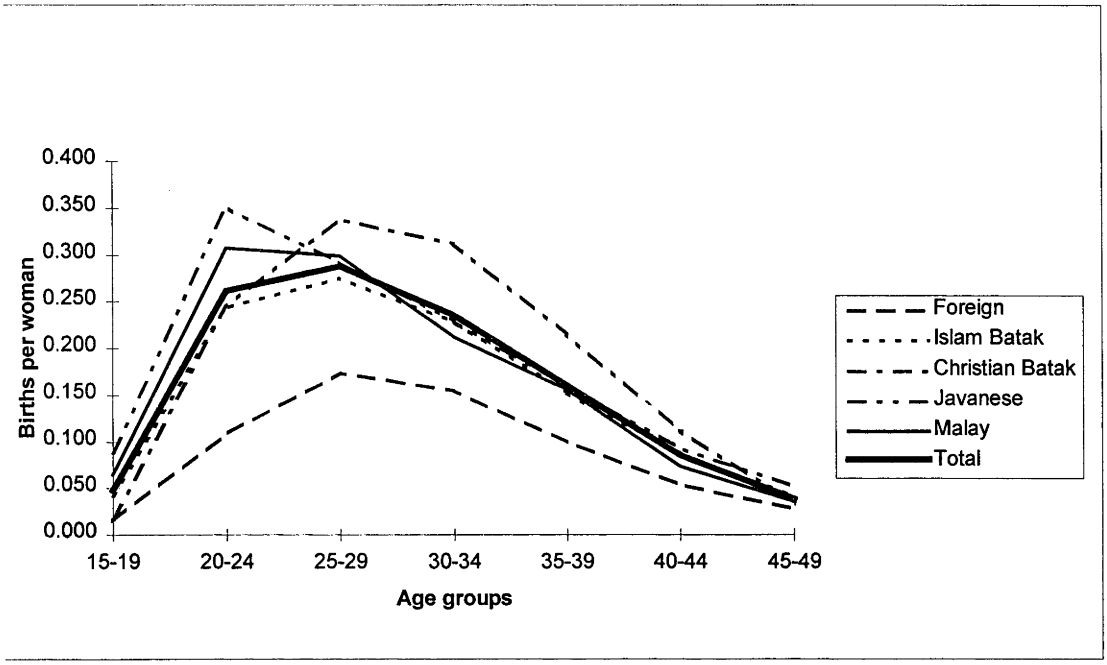
Table 4.3. The Age Specific Fertility Rates in North Sumatra, 1980-1990 according to ethnic identity

Year / Age groups	Population					
	Foreign	Muslim Batak	Christian Batak	Javanese	Malay	Total
1980						
15-19	0.015	0.042	0.017	0.088	0.065	0.048
20-24	0.108	0.244	0.245	0.351	0.307	0.261
25-29	0.174	0.275	0.338	0.291	0.299	0.288
30-34	0.155	0.228	0.312	0.229	0.212	0.235
35-39	0.100	0.152	0.214	0.159	0.156	0.160
40-44	0.054	0.087	0.112	0.092	0.073	0.085
45-49	0.028	0.041	0.033	0.052	0.035	0.038
Average age of childbearing	31.4	30.4	31.2	29.5	29.5	30.2
1990						
15-19	0.012	0.022	0.013	0.042	0.031	0.023
20-24	0.090	0.173	0.159	0.206	0.194	0.162
25-29	0.141	0.215	0.238	0.190	0.208	0.209
30-34	0.120	0.211	0.232	0.123	0.169	0.179
35-39	0.056	0.138	0.146	0.093	0.104	0.113
40-44	0.019	0.056	0.070	0.034	0.038	0.047
45-49	0.006	0.016	0.017	0.014	0.011	0.013
Average age of childbearing	29.7	30.5	31.0	28.8	29.4	30.1

Source: 1980 and 1990 Census data tapes

The fertility pattern according to ethnic groups in North Sumatra in 1980 can be seen in Table 4.2; the pattern is also shown in a graphical presentation in Figure 4.1. The patterns of fertility can be categorised into two groups: Group 1, the Javanese and the Malays, and Group 2, the Christian Batak, Muslim Batak, and Chinese ethnic groups. The first group is characterised by a lower mean age at childbearing. The highest level of ASFR of this group occurs in age group 20 to 24 years old. Group 2 has the highest level of ASFR in age group 25 to 29 years old.

Figure 4.1. The ASFR of North Sumatra according to ethnicity 1980



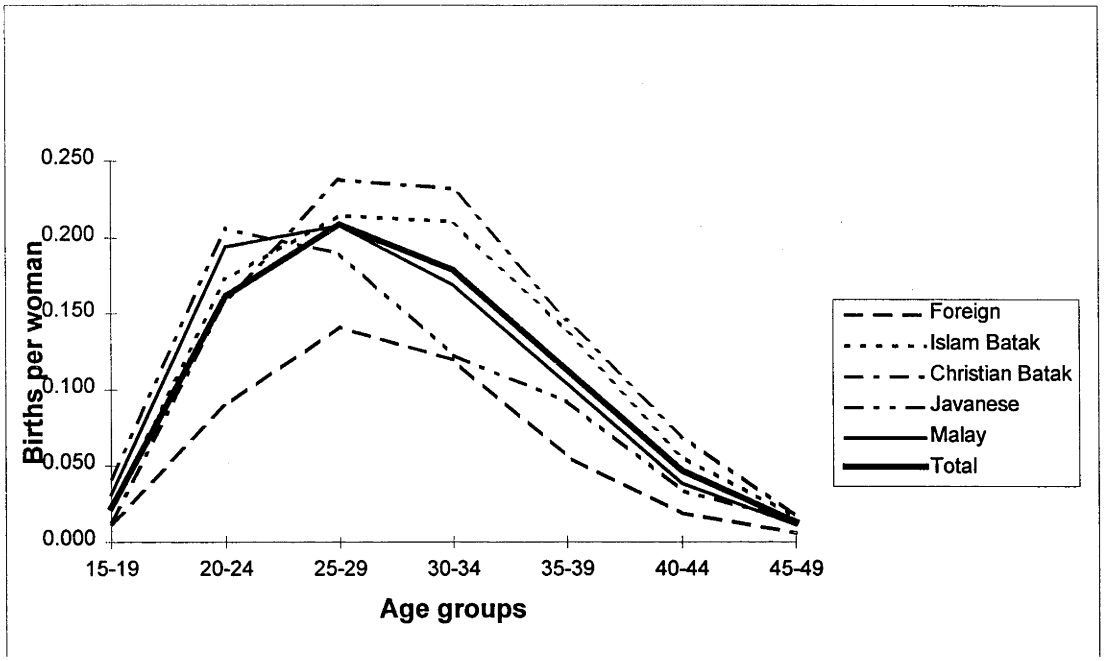
The slope of the graph line after the peak level shows the possibility of fertility to decline in the future. It can be seen from the Figure that the Javanese fertility had the steepest slope and the Christian Batak the shallowest.

The beginning and the ending of childbearing influence the pattern of fertility. The beginning of childbearing is usually related to age at first marriage, which is the indicator of first sexual union in Indonesia, including North Sumatra, since extramarital sexual activity is unacceptable religiously, legally, socially, and culturally. The age at first marriage in North Sumatra, as mentioned earlier, is related to culture, education, and government laws.

In 1980, the Javanese and the Malay ethnic groups practised relatively young marriage compared to the other groups, possibly because the Javanese and Malays have relatively low levels of education for women and a tradition of early marriage. Field information is consistent with this. One of the informants said that most of the Malays who live along the coast still practised the old traditions including early marriage until at least the early 1990s. This was also the case for the Javanese society who lived in the plantation areas: marriage among the Javanese occurred as soon as a person obtained a job in the plantation. The benefits offered by the plantation, such as accommodation and family allowance attracted not only the workers, but also their parents. Therefore, it is very likely that once their child had a job in the plantation, the parents immediately arranged his or her marriage. As is the case for all ethnic groups in North Sumatra, marriage across ethnic group boundaries is rare for the Javanese.

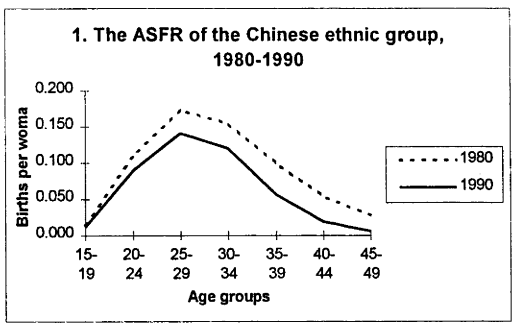
In 1990, the pattern had slightly changed. As can be seen in Figure 4.2, the Javanese and Malay both had the highest level of child bearing in the age group 20 to 24 years. This pattern is similar to that of 1980, but, the level was lower than those of other ethnic groups such as the Christian Batak, and Muslim Batak. The Figure also shows that the fertility of the Javanese is more likely to fall, as indicated by the steepness of slope of the line after it reaches the peak. In general, the fertility levels had dropped a lot for all ethnic groups between 1980 and 1990.

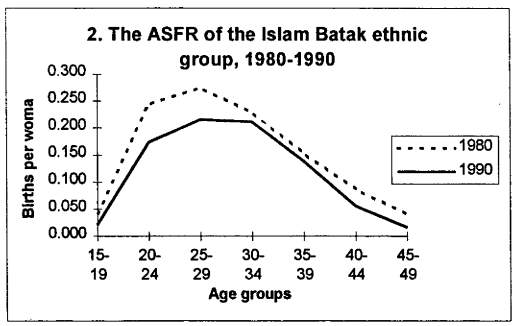
Figure 4.2. The ASFR of North Sumatra according to ethnicity: 1990

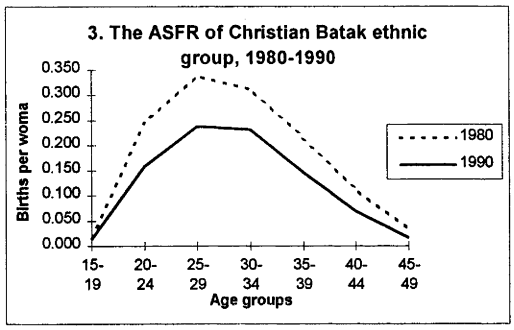


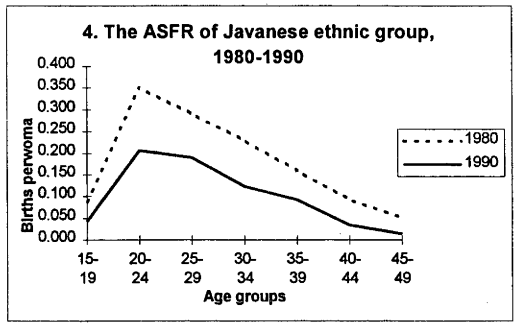
Changes in fertility pattern from 1980 to 1990 for individual ethnic groups can be seen in Figures 4.3.(1 to 6). The first groups that had a similar pattern in 1980, the Javanese and the Malays, can be seen in Figures 4.3.(4) and 4.3.(5) The fertility pattern of the Javanese does not seem to have changed during the 1980s; the only difference is that the fertility level in 1990 is lower than that in 1980; this indicates that the fertility level of the Javanese declined but the age specific pattern remained the same. Possible reasons are the increase in age at first marriage and the early cessation of childbearing related to the use of modern contraception.

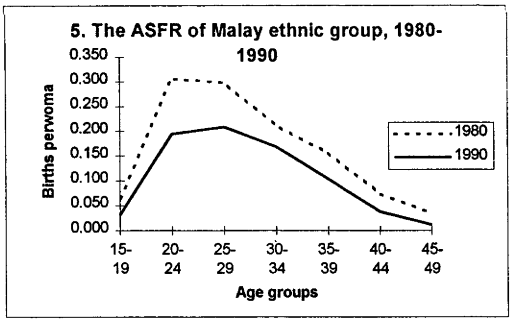
Figure 4.3 ASFR by ethnic groups, 1980-1990

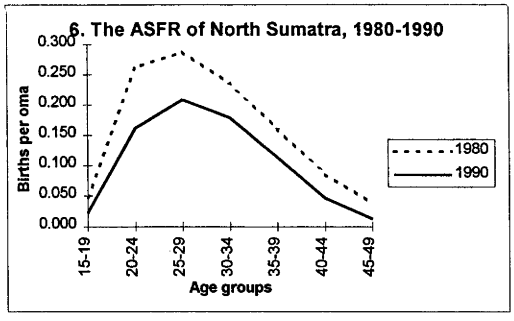












Malay fertility, which in 1980 had a similar pattern to that of the Javanese, had changed slightly by 1990. In 1980, the highest level of ASFR was in the age group 20 to 24 years; in 1990 it moved slightly to age group 25 to 29 years. The average age of child bearing, however, does not show any changes (see Table 4.3.). A similar finding is also shown for the other ethnic groups. The similar fertility pattern between 1980 and 1990 can be seen in Figures 4.3 (1), (2) and (3) that refer to the

fertility pattern of the Chinese, the Christian Batak, and Muslim Batak ethnic groups respectively. It can be concluded that all ethnic groups experienced a declining fertility level with a similar age specific fertility.

4.4. Components related to fertility decline: a further observation

In general, fertility decline in North Sumatra is attributable to family size limitation efforts among the married couples and the rise in age at first marriage. The limitation of family size is normally carried out through the use of contraception of which traditional methods are available, but their efficacy is not known. The Javanese recognise herbal mixture (*jamu*) as their traditional contraception, but it is more to regulate menstruation than to prevent conception. Abortion in Indonesia, including North Sumatra, is an uncommon option for the married couple to control fertility. So most fertility control is by modern contraceptive use, which is consistent with the government efforts to promote the family planning program in North Sumatra.

The rise in age at first marriage is also one of the main causes of fertility decline in North Sumatra. This trend is associated with social, economic, and cultural change in the society. Government policy to improve education, especially for women, has contributed to the rise. The Indonesian government launched a compulsory primary education program in the 1980s; consequently, the age at first marriage has also increased. Other government policy that is related to the rise in

age at marriage is the government marriage law passed in 1974, according to which, the minimum age for women to marry is 16 years old, while for men it is 19 years old. This law has been successfully implemented despite strong argument from the strict Islamic organisations (Katz, 1978). The law has led to a rise in the age at first marriage and the elimination of child marriage that was previously practised by some traditional societies. However, validation of age is difficult because about half of all births in Indonesia were not registered and existing records are unreliable; so it is possible to get local officials to exaggerate age (Katz, 1978).

The incidence of unreliable records varies according to regions. In the provinces where the former Dutch colonial influence was strong outside Java, such as in North Sulawesi, Maluku, and North Sumatra, vital events are usually better recorded, because people became familiar with the vital statistics recording system introduced by the colonial government. Besides, in these provinces, education levels are normally higher than in other places; so the marriage law is likely to have a strong effect.

4.5. Variation in marital fertility change indicators by ethnic groups

Marital fertility is strongly related to the effort to limit family size among married couples. Some of the efforts that are likely to occur in the study areas are the use of contraception, and voluntary abstinence; because there is no information about

voluntary abstinence, this factor is not discussed further. Abortion is the last option for a legally married couple to limit family size, not only because abortion is illegal in Indonesia, but also because it is not widely accepted by the society.

Contraception can be divided into two categories: traditional, and modern. The effectiveness of the traditional contraception used by some people in the society, is not known. The Javanese and the Chinese are known to use these types of contraception. The traditional herbal mixture is usually a menstruation regulator; sometimes it works as an abortifacient. Modern contraception, which is very effective in inhibiting pregnancy,therefore, is the most likely factor associated with the effort to limit family size.

The indicator used to see the change in marital fertility rates in this study is I_g. The lower the level of the index, the higher the extent of family limitation effort. Table 4.4 below shows I_g in North Sumatra in 1980 and 1990, and the change between those dates.

The Chinese marital fertility level is the lowest among the ethnic groups. As shown in Table 4.4., the 1980 I_g for the Chinese is 0.48, which indicates that the Chinese had been practising some sort of marital birth control.

Field observation shows that the Chinese do not normally go to public health centres (*Puskesmas*) or *Posyandu* for family planning or other purposes; in North

Sumatra, especially in Medan, they normally go to the private medical practitioners, or private hospitals. It is likely that this ethnic group controlled family size by their own efforts. This is possible because some type of contraception such as condoms, spermicides, and female diaphragms are widely available not only in the pharmacies, but also in most supermarkets. This indicates that this ethnic group have the awareness and finance to control family size. This finding also shows why some people think that the Chinese have a high level fertility while in fact they have the lowest level.

Table 4.4. I_g indices in North Sumatra, 1980-1990

Population	I_g index		Change in I_g
	1980	1990	
Foreign	0.48	0.41	0.07
Muslim Batak	0.56	0.50	0.06
Christian Batak	0.68	0.55	0.13
Javanese	0.64	0.45	0.19
Malays	0.68	0.59	0.09
Total	0.64	0.49	0.15

Source: 1980 and 1990 Indonesian Population Census data tapes.

In 1980, the Christian Batak, Malays and Javanese are in one group that had the highest index. A similar level of the Index was observed in Mexico and Taiwan in the early to mid-1960s before the decline in the Taiwanese birth rate. The range of I_g in those countries fell between 0.67 and 0.83 which was also found in western Europe (excluding France) in the late nineteenth century (Coale, 1965: 206).

This indicates that in 1980, marital fertility of these three ethnic groups was in the fertility pre-transition stage: there was little effort to limit family size among them.

There are three possible reasons for this: family planning was not yet well introduced, the traditional method of contraception, including voluntary abstinence and the use of traditional herbs (*jamu*), was absent or negligible, and the culture and traditions still preferred large family size. Field observation shows that the old generation normally had large families: families of more than five children were common. This information was obtained from all of the ethnic groups, with the exception of the Chinese.

There is no clear explanation for the level of the Index for the Muslim Batak. A possible reason why they had lower I_g than to the Christian Batak, Javanese and Malays is that the they had traditionally used some sort of marital fertility limitation, but no information from fieldwork can explain this finding.

Fertility transition seems to have occurred by 1990 in all ethnic groups in North Sumatra. As can be seen in Table 4.4, the fertility indices of all ethnic groups declined in the 1980s. However, the pace of change in each ethnic group was not the same, as is indicated by the change in the ranking of the index level from 1980 to 1990. The lowest level of the index in 1990 is still the same as in 1980: the Chinese ethnic group. This is followed by the Javanese, Muslim Batak, and Christian Batak, with the highest level in the Malay ethnic group.

The Javanese experienced the fastest decline in marital fertility as shown by the biggest change in the index level; surprisingly, this is followed by the Christian

Batak marital fertility. The Christian Batak are known to support a large-family norm; the use of contraception through the family planning program is likely to have played an important role in the change.

For the Javanese, the information from the fieldwork indicates that there was a dramatic increase in family planning acceptors, especially in the plantation areas. The acceptance of family planning programs in these areas is influenced by the traditional and formal leaders who, among the Javanese, are very influential in almost every aspect of life. This is still the case in North Sumatra, especially in and around the plantations, and in the predominantly Javanese areas. The type of contraception used is mostly non-permanent contraception.

This is different from the experience of the Christian Batak. In the field, the term, 'Batak' usually refers to the Christian Batak ethnic group, because the Muslim Batak usually use their place of origin, such as Mandailing, to describe themselves. According to the information gathered in the field, the Batak ethnic group did not accept contraception easily, but once they decided to use it, they preferred sterilisation which is the most effective contraception. This explains the steady decrease in the index level of marital fertility of this ethnic group.

The smallest change in the marital fertility index level occurred for the Chinese, Muslim Batak, and Malay ethnic groups. The Chinese had experienced the least change in the index level, because the level of fertility for the Chinese was already

low in 1980: the small-family norm was already observed by the Chinese ethnic group. Having a large number of children is no longer regarded as advantageous, because of the increase in the cost to raise children. For the Chinese, the cost is more related to the cost of education: field observation shows that most of the Chinese children go to private schools which are more expensive than the state schools, as most of the private schools are not subsidised by the government.

The findings also show that there had been a relatively small change in marital fertility among the Muslim Batak and the Malay ethnic groups, suggesting a modest use of modern contraception. This may be related to religion; it is widely known in North Sumatra that the Malays and Muslim Batak are devout Muslims.

Field observation shows that the Malays and the Mandailing Batak had some degree of resistance toward the introduction of the family planning program, especially toward the use of contraception. This occurred especially at the beginning of the program in this province from the late 1970s to the early 1980s. Religious leaders are very influential among these ethnic groups. Some of them believed that modern contraception is against the Islamic teachings. The Indonesian government seemingly do not want to confront if there is religious resistance in implementing their programs, including family planning. Consequently, the family planning program in these areas is not as successful.

However, it was found that the people had known the use of *jamu* for health and sexual purposes for a long time in the province. The herbs can be bought almost every where in North Sumatra; in the big cities like Medan, Chinese herbs are also widely known. Most traditional healers (*dukun*) usually use self-prepared herbs: a variety are sold, including the menstrual regulator herb. This is also known to be some sort of abortifaciant, because it is taken by a woman to 'force' her menstruation when it is late. It is clearly indicated as not to be taken by pregnant women. Therefore one of the purposes of this herb is to terminate pregnancy. My personal interview with one of the herb shop owners revealed that that particular herb is used for that purpose. The efficacy of these herbs is not known.

4.6. Variance in proportion married by ethnic groups

The proportion married in the reproductive ages is related to factors such as age at first marriage and the proportion who ever marry. Age at first marriage is influenced by education and culture. Education, especially for women, has a more direct effect upon the increase of age at marriage than cultural factors, because a girl will have to delay her marriage as long as she still goes to school. Therefore, the higher the education level, the higher the age of marriage. In this section this change is observed through the index of proportion married: I_m. The lower the age at first marriage and the higher the proportion who ever marry, the lower the level of the index. Coale (1965) gives an example of India's I_m in 1960 which was 0.88. According to Coale, this level indicates that marriage is universal in India before age of 30 years and that marriage occurs very early. He also gives an opposite

extreme example of I_m index level in Ireland in 1900. At that time, the index in that country was 0.31. Coale interprets this level as associated with the tendency to remain single combined with late marriage.

In the case of North Sumatra, there is no indication of any tendency to remain single in the society included in this study. Traditionally, marriage is universal in the society regardless of the ethnic group. Therefore, the most important factor associated with the index is the age at first marriage.

Table 4.5. I_m indices in North Sumatra, 1980-1990

Population	I_m index		Change in Index
	1980	1990	
Foreign	0.49	0.44	0.05
Muslim Batak	0.72	0.64	0.08
Christian Batak	0.67	0.59	0.08
Javanese	0.78	0.64	0.14
Malay	0.71	0.62	0.09
Total	0.66	0.58	0.08

Source: 1980 and 1990 Indonesian Population Census data tapes.

Table 4.5. shows that the lowest level of the index and change in the period 1980 to 1990 occurs in the Chinese ethnic group while the Javanese had the highest I_m in both years. The Christian Batak, the Muslim Batak and the Malays, also had relatively high levels of I_m in 1980. The Javanese experienced the biggest change in the Index in 1980s, even though their level was still the highest in 1990.

The late marriage of the Chinese is because of at least two factors: education and culture. The Chinese in North Sumatra are known to have better education than the indigenous ethnic groups, not only because they have attended modern

education institutions since the colonial time, but also because they can afford the costs of education. This is important because the Chinese normally go to private schools that are more costly than the state schools. Most of the Chinese are involved in business and trade, so they need at least primary education to do the administrative work. In the past, the Chinese had two choices of school, the Indonesian school or the Chinese school, but the Chinese schools are no longer permitted by the government to avoid racial tension between indigenous people and the Chinese. Culturally, marriage for the Chinese also means independence, thus marriage occurs only among the economically prepared couples. Therefore, early marriage is very rare among the Chinese.

The Javanese, Muslim Batak and the Malay tend to marry early. Traditionally, those ethnic groups do not oppose young marriage; as most of them work in the agricultural sector, it is not a disadvantage. In fact for those who work in the plantations being married is a benefit, because they are eligible for facilities provided for families by the estate company such as housing, and marriage allowance. For those who live in the traditionally agricultural areas, young marriage is merely a choice. There is also a possible relationship between young marriage and religion. This is shown in Table 4.5 as Islamic ethnic groups tend to have a higher I_m index, compared to other religions. This observation, again, is only for the period 1980 to 1990.

The findings show that the Javanese experienced the largest decline in the marriage indicator. This is probably related to the introduction of mass primary education by the government; the Javanese, who had a low education level, have been taking advantage of this program. Other ethnic groups such as the Chinese and the Batak, had been exposed to the modern education system since the colonial era. The growing concern about the benefits of better education is likely to be related to inter-ethnic competition for access to economic opportunities.

4.7. Components of the decline

In this section, the components of fertility decline are compared. The purpose of the section is to see what is the contribution of the different components to the decline in fertility between 1980 and 1990. Table 4.6 shows the results of the calculation: the Javanese and the Christian Batak make different contributions to the marital fertility and proportion married factors. Other ethnic groups show a balanced contribution between the two indicators.

Table 4.6. The components of difference in the decline in fertility in North Sumatra, 1980-1990 according to ethnicity

Population	change in I_f	Components of I_f	
		I_g	I_m
Foreign	0.05	0.02	0.03
Muslim Batak	0.08	0.04	0.04
Christian Batak	0.13	0.05	0.08
Javanese	0.21	0.08	0.13
Malays	0.12	0.06	0.06
Total	0.14	0.05	0.09

Source: 1980 and 1990 Indonesian Population Census data tapes

Among the Javanese and the Christian Batak, the ethnic groups that have the largest decline in fertility, the proportion married has a greater effect on the reduction of fertility than does marital fertility.

This indicates that the fertility decline among the Javanese and the Christian Batak is more related to the increase in age at marriage than to contraceptive use. Increase in age at marriage is closely related to increase in education levels, so it is evident that education has a stronger relation to the decline in fertility for the Javanese and Christian Batak than the use of contraception.

Education levels of the Javanese ethnic group were low at the beginning of the observation period. The fertility decline in this group is more associated with the introduction of primary education, the influence of which has been especially to increase the age at first marriage. For the Christian Batak, the effect of education is more on the secondary and higher levels of education. A further observation on this finding is discussed in Chapter 5.

4.8. Conclusion

There has been a variation of fertility decline experience in North Sumatra according to ethnicity. The decline in this period is actually a continuation from the period before 1980. Ethnic groups that had low fertility at the beginning of the period observed (1980) had experienced fertility transition earlier, including the

Chinese who had the lowest fertility in 1980. Other ethnic groups had very little or no indication of fertility decline before 1980.

The variation in the decline in the 1980s is related to the unique cultural background of each ethnic group. The Chinese had experienced fertility decline before 1980, probably because of traditions of late marriage, and other factors associated with the disadvantage of having a large number of children.

The Muslim Batak and the Malays had a similar pace of fertility decline in the period 1980 to 1990. Both ethnic groups also had slightly lower levels of fertility at the beginning of the observed period, which means that the fertility of both groups had started to decline, albeit very modestly before 1980. Since the age at first marriage was likely to be early, these two ethnic groups were likely to practise traditional ways of preventing births. The pace of decline in the 1980s did not show a substantial acceleration; the slow decline is likely to be related to their traditions, culture and religion. This is consistent with the finding that there is also similarity in the components related to the decline. Both the use of contraception and increase in age at first marriage of these groups have contributed to the fertility decline in the same proportions.

The Christian Batak is the group that was believed resisting to the idea of family size control, because traditionally they prefer to have a large number of children. However, this study shows that fertility levels of this ethnic group declined

substantially form 1980 to 1990. At the beginning of the period, there was no indication that their fertility would fall; it was very high in 1980. The main factor related to the decline is the increase in age at marriage. This is likely to be associated with education, especially at the secondary level. The use of contraception, especially sterilisation, is also likely to be related to the decline.

The largest decline in fertility for the Javanese ethnic group experienced the period 1980 to 1990. No indication of the imminent decline was observed at the beginning of the period, because the level was very high. Both the use of contraception and the increase contribute to the decline in age at marriage. This is likely to be related to the virtual absence of resistance to the introduction of family planning program, especially the use of contraception. The Javanese ethnic group has accepted the government policy programs most readily. However the largest contribution to the decline is the increase in age at first marriage, probably related to the introduction of mass primary education in North Sumatra.

CHAPTER 5

IS EDUCATION AN IMPORTANT FACTOR IN FERTILITY DECLINE IN NORTH SUMATRA?

5.1. Introduction

This chapter deals with the role of education of ethnic groups in the decline in fertility in North Sumatra. Education is a central indicator of social change and is well known to be related to behavioural changes in a society, including fertility behaviour. This chapter observes the relationship between the education of each ethnic group and the decline in fertility, especially between 1980 and 1990.

As discussed in Chapter 2, a modern education system was introduced to some parts of the province in the colonial era, but there are differences in the levels of exposure to education among the ethnic groups, some of which have had this advantage longer than others. This chapter focuses on the effect of education since the introduction of mass primary education in Indonesia, including North Sumatra, in the mid 1970s. However, past experience of education may also have affected some ethnic groups.

Modern primary and secondary schools have long been established in Medan as the capital of North Sumatra; the Chinese, who mainly live in the urban areas have benefited from this system since the colonial era. A formal education system had long been established in other areas such as Tapanuli Utara, Simalungun, and Karo regencies. Since the founders of the education systems in those areas were mostly Christian missionaries, the type of education is also related to the religion: those who benefited were the Christians, in this case the Christian Batak.

However, in the later development, these schools were opened to all; people in the areas surrounding the schools could go to them. However, because of the limitation in school facilities, no significant effect could have been expected until the government introduced compulsory primary education in line with the establishment of *Sekolah Dasar Inpres* (primary schools established based on presidential instruction). The impact of this policy is likely to be evident in the findings in this study.

There are several sub-topics discussed in this chapter: the relationship between education and the level of fertility of each ethnic group, age specific fertility patterns both for those with primary education and those with secondary education, the role of changes in marital fertility and the proportion married in the decline in fertility by education, and the components of difference of the fertility change.

5.2. Fertility levels and trends by education

Those who have primary education in this study is defined as those who finished six-year elementary school or less, while those with secondary education is defined as those who have higher than primary education. As described in Chapter Two, primary education in Indonesia was developed universally in the recent past. This has significant impact to elevate the number of people who finished elementary school. The next government program was to introduce the compulsory junior high school level of education. The examination of the differences between primary and secondary levels will reveal the importance of educational improvement at the higher levels. This study relates the differences in those educational levels to the decline in fertility of each ethnic group.

Table 5.1. below shows the percentage of women aged 15 to 49 according to ethnicity and education. There are two age groups: the young are defined as those aged 15 to 29, while the older age group is those aged 30 to 45. It can be seen from the table that the proportion of women with secondary education had risen from about as low as four per cent for the Javanese to about 26 per cent for the Chinese in 1980 to about 15 per cent to about 51 per cent in 1990 for the same ethnic groups.

Table 5.1. The percentage of women aged 15-49 according to ethnicity and education in North Sumatra, 1980 and 1990

	1980		1990		Change of
	Primary*)	Secondary	Primary*)	Secondary	Secondary*).
Foreign					
15-29	71.3	28.7	37.4	62.6	34.0
30-49	77.2	22.8	61.1	38.9	16.1
Total	73.5	26.5	48.6	51.4	24.9
Muslim Batak					
15-29	83.9	16.1	61.9	38.1	22.1
30-49	91.5	8.5	84.8	15.2	6.7
Total	86.5	13.5	71.1	28.9	15.4
Christian Batak					
15-29	73.4	26.6	48.1	51.9	25.3
30-49	84.8	15.2	74.6	25.4	10.2
Total	77.6	22.4	59.2	40.8	18.4
Malay					
15-29	80.4	19.6	56.9	43.1	23.5
30-49	85.6	14.4	78.7	21.3	6.9
Total	82.0	18.0	64.7	35.3	17.3
Javanese					
15-29	95.7	4.3	77.8	22.2	17.9
30-49	97.9	2.1	96.5	3.5	1.4
Total	96.3	3.7	84.7	15.3	11.6

Source: the 1980 and 1990 Census data tapes
*) includes no schooling

The average rise for those with secondary education from 1980 to 1990 did not vary substantially, ranging from about 12 per cent for the Javanese ethnic group to about 25 per cent for the Chinese ethnic group. Young women, however, has a wider range, spreading from about 18 per cent for the Javanese ethnic group to about 34 per cent for the Chinese. It is worth to note that the increase among the Javanese is occurred from as low as only about four per cent in 1980 to about 12 pe cent in 1990. The Muslim Batak, Christian Batak and the Malays seem to have similar increase.

This section describes the levels and trends of fertility of each ethnic group according to level of education. Total Fertility Rates are calculated to observe the change in fertility from 1980 to 1990. The other way used in this study to observe the change in the fertility levels and trends is by calculating the Coale index, in this case, I_f, to measure general fertility. The findings are shown in Table 5.2., and Table 5.3. This section will also examine whether there were any changes of fertility in each level of education of each ethnic group over the ten-year period.

Table 5.2. The decline in Total Fertility Rates in North Sumatra, 1980-1990, according to ethnicity and education level

Education level/Population	TFR		decline
	1980	1990	
Primary education			
Foreign (mostly Chinese)	2.80	2.95	-0.15
Muslim Batak	5.42	4.54	0.88
Christian Batak	6.69	4.73	1.96
Javanese	7.14	3.74	3.40
Malays	6.00	4.33	1.67
Total	6.07	4.20	1.87
Secondary education			
Foreign (mostly Chinese)	n.a.	1.54	n.a.
Muslim Batak	4.69	3.31	1.38
Christian Batak	6.54	4.14	2.40
Javanese	4.47	2.96	1.51
Malays	4.87	3.24	1.63
Total	4.82	3.17	1.65

Source: 1980 and 1990 Census data tapes
Note: n.a. the number of cases is too small

As can be seen in Table 5.2 the total fertility rates of the Chinese ethnic group with primary education are relatively similar in 1980 and 1990. A similar finding is also shown for the I_f indices in Table 5.3, which indicates that their fertility behaviour did not change during the period of observation. It is also evident that the fertility level of the Chinese ethnic group in 1980 was relatively low. In fact, the level was the

lowest among all ethnic groups. The experience of fertility transition in Indonesia, like in Bali and Yogyakarta, shows that once the fertility decline reaches a low level, the pace of the decline becomes slower (BPS, 1997). This is the reason for the slower pace of the decline, which occurred in the fertility level of the Chinese ethnic group. Measurement in the change in fertility for Chinese with secondary education is not possible since the number of cases in 1980 is too small to estimate the fertility level.

Table 5.3. The change in Coale indices for general fertility (I_f) in North Sumatra: 1980-1990 according to ethnicity and education level

Population	I_f Index		change in I_f
	1980	1990	
Primary Education			
Foreign	0.24	0.24	0.00
Muslim Batak	0.40	0.36	0.04
Christian Batak	0.48	0.35	0.13
Javanese	0.53	0.30	0.23
Malay	0.47	0.35	0.12
Total	0.45	0.34	0.11
Secondary Education			
Foreign	n.a.	0.12	n.a.
Muslim Batak	0.33	0.24	0.09
Christian Batak	0.40	0.28	0.12
Javanese	0.33	0.21	0.12
Malay	0.39	0.26	0.13
Total	0.34	0.22	0.12

Source: the 1980-1990 Population Censuses data tapes
Note: n.a. not applicable; the number of cases is too small

Fertility has declined in various stages for other ethnic groups with primary education. The smallest decline occurred in the Muslim Batak ethnic group, followed by Malays, and Christian Batak; the largest decline occurred among the Javanese ethnic group. The explanation for these findings is that the influence of

cultural and traditions was stronger than other socio-economic changes for the ethnic groups that show little change over the period observed.

For those with secondary education, the variation of the change is smaller than for those with primary education. This can be seen in the similar changes in I_f. This indicates that the higher the education, the smaller the variation in fertility decline among the ethnic groups in North Sumatra.

The role of education can be observed through the difference in the change in decline between those with primary and those with secondary levels of education. Changes associated with education have varied among the ethnic groups over the period observed. As can be seen in Table 5.3, for Muslim Batak, a larger fertility decline occurred among those with secondary education than among those with primary education. The opposite situation occurred for the Javanese, while Malay and Christian Batak fertility decline was the same regardless of education level.

The levels of the total fertility rate in Table 5.2 suggest that the members of the Muslim Batak and the Christian Batak ethnic groups with primary education were more resistant towards the reduction of fertility as compared to those with secondary level of education. The Javanese had a different experience, the higher the education the smaller the fertility change.

The experience of fertility transition in Europe shows that the relationship between education and fertility decline is negative, that is, the higher the education the lower the fertility (McDonald, 1993:7; Leete, 1996: 32-33). A similar relationship is found in the experience of the Islam and Christian Batak. As described in Chapter Two, the Batak have strong ethnic ties and still practise traditional gatherings, functions, or ceremonies such as weddings, funerals and other social occasions: these activities make the ethnic ties strong and the groups inter-dependent. All problems of daily life are solved jointly by the group. Those who benefit from this are normally those with low socio-economic status, including those with a low level of education. This is one of the reasons why Muslim and Christian Batak with primary education have had a smaller fertility decline than those with secondary education.

A strong effect of education upon fertility level can also be found among the Javanese with fertility being lower when the education level increases (see Tables 5.2 and 5.3). However, unlike that of the Christian Batak, during the 1980s fertility decline among the Javanese was greater for those with primary education than those with secondary education. As a result of the introduction of compulsory primary education, the education level of the Javanese ethnic group, which was previously low, improved significantly over the period of 1980 to 1990. As shown in the table, in 1980 the effect of education level upon fertility was much stronger than in 1990. It may be that the smaller group of Javanese with primary education in 1990 was selective of people subject to intensive activities of the government

family planning program, such as plantation workers. The plantation workers, who are mostly Javanese, to some extent are 'captive audience'. They are an easy target of the introduction of family planning programs. This could be one reason of the sharp fall in fertility among this particular ethnic group.

The effect of education upon fertility decline for the Malays is similar for both those who had primary and secondary education levels; this suggests that similarities arising from traditions and culture had a stronger effect in reducing fertility than education level. Linkages across levels of the society may be related to the fact that the Malays, especially those with low socio-economic status, remain respectful toward the descendants of the past royal family who usually have high socio-economic status.

5.3. Age specific fertility patterns

This section examines the age patterns of fertility of each ethnic group for those with primary and secondary levels of education. The change between 1980 and 1990 is also observed. First, the age pattern of fertility according to ethnic group is examined for women with primary level education in 1980 and then this is compared with the situation in 1990. Similar analysis is then made for those with secondary education. The purpose of the analysis is to see whether there are any changes in the age pattern of fertility among the ethnic group after removing the effect of education. It was found that the age fertility patterns in all ethnic groups show a similarity between those with primary and those with secondary education.

This may indicate that ethnic background, including tradition and culture, is more strongly related to the age pattern of fertility than education level.

Table 5.4 shows age specific fertility rates for women with primary education according to ethnic group. A graphical presentation of these data can be seen in Figures 5.1 and 5.2. In 1980, as can be seen in Figure 5.1, three ethnic groups have their peak fertility in the age group 20 to 24 years: the Javanese, the Malays and the Chinese.

Table 5.4. The Age Specific Fertility Rates in North Sumatra: 1980 and 1990 for population with primary education according to ethnic identity

Age Groups 1980	Population Foreign	Muslim Batak	Christian Batak	Javanese	Malay	Total
15-19	0.111	0.043	0.020	0.089	0.073	0.055
20-24	0.143	0.248	0.272	0.360	0.305	0.292
25-29	0.117	0.265	0.341	0.303	0.307	0.294
30-34	0.088	0.216	0.311	0.252	0.214	0.246
35-39	0.049	0.149	0.221	0.182	0.172	0.174
40-44	0.012	0.081	0.116	0.129	0.074	0.095
45-49	0.016	0.051	0.041	0.082	0.037	0.041
1990						
15-19	0.028	0.027	0.018	0.054	0.050	0.036
20-24	0.157	0.214	0.197	0.227	0.240	0.218
25-29	0.179	0.218	0.250	0.189	0.217	0.213
30-34	0.151	0.224	0.234	0.123	0.177	0.180
35-39	0.060	0.143	0.149	0.095	0.113	0.120
40-44	0.016	0.061	0.071	0.035	0.043	0.051
45-49	0.000	0.019	0.019	0.019	0.016	0.016

Source: the 1980 and 1990 Census data tapes

This early peak may be related to early age at first marriage or the use of contraception in the early years of marriage. The flat pattern of the graph after the peak childbearing age group has been reached is normally indicative of relatively low use of fertility control.

By 1990, however, there had been a change in the pattern among these three ethnic groups. The Javanese and the Malays still have a young peak of childbearing, however the Javanese age pattern of fertility has a steeper decline than that of the Malays after the peak: this is indicative of greater use of contraception.

Differing from these two ethnic groups, the Chinese fertility pattern had changed by 1990 after having a relatively flat pattern in 1980. The peak age of childbearing for Chinese with primary education had moved to age group 25-29 by 1990.

An increased age at marriage is related to traditions practised among the Chinese ethnic group. This indicates that there had been a relationship between the change in socio-economic development and traditional fertility behaviour among the Chinese ethnic group with primary level of education. Furthermore, this is in relation to the possible increase in modern contraception during the period observed. The family planning programs introduced by the government during that period have made modern contraception easily accessible. Use of family planning is indicated by the fact that in 1980 the graph is relatively flat after the peak of childbearing, while in 1990, a steeper decline can be seen after the age group 30-34 years.

Figure 5.1. The ASFR of North Sumatra for population with primary education according to ethnicity: 1980

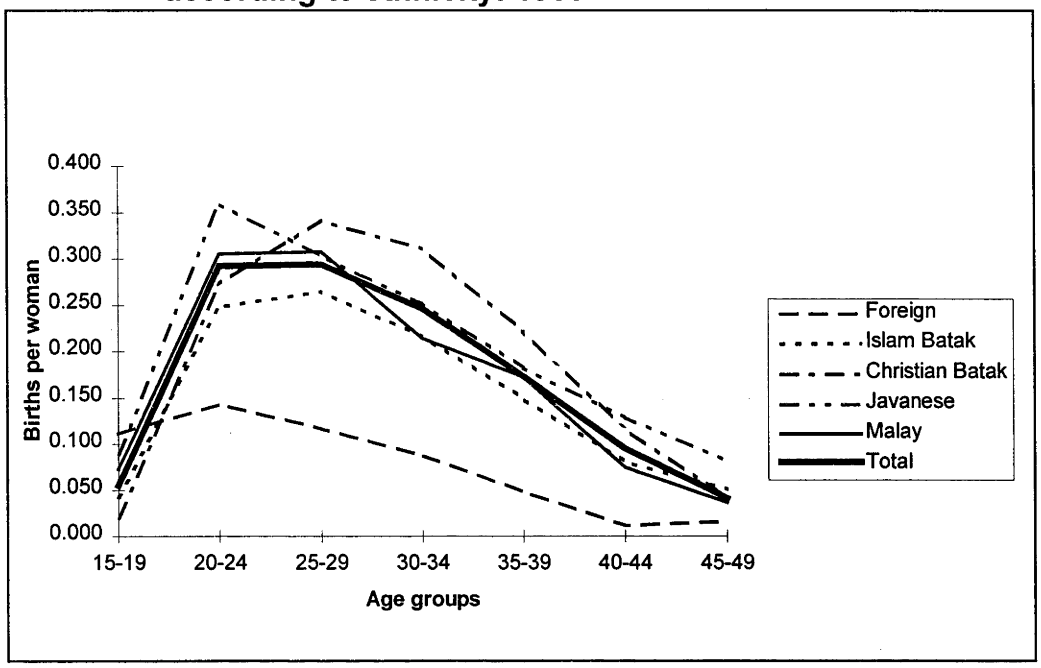
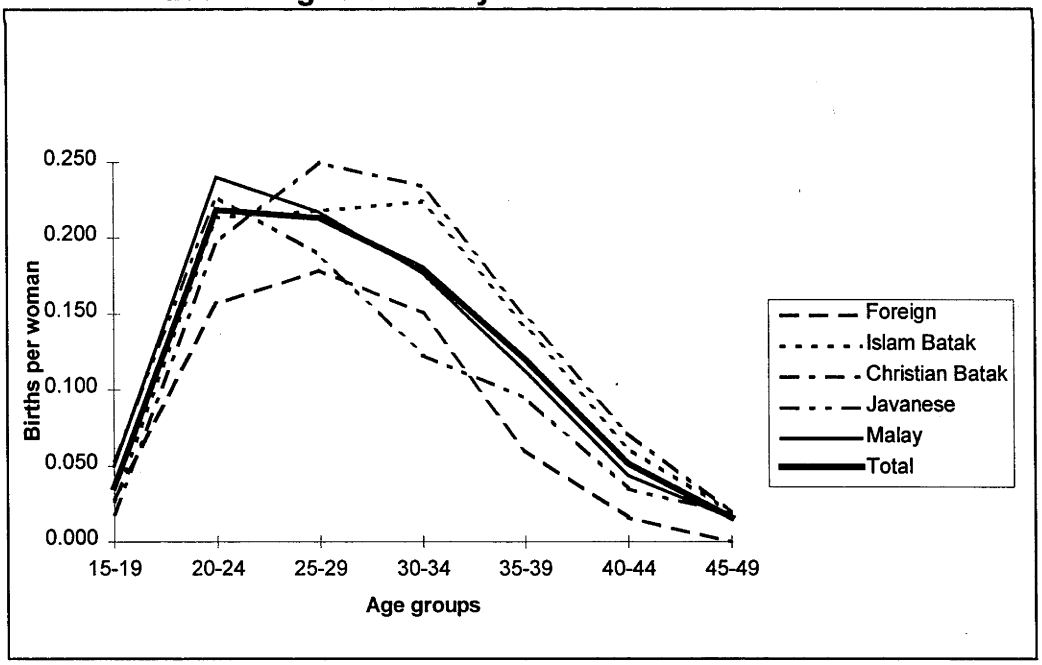


Figure 5.2. The ASFR of North Sumatra for population with primary education according to ethnicity: 1990



Source: the 1980 and 1990 Census data tapes

Despite the differences between the Christian and Muslim Batak fertility levels and religions, the age pattern is relatively similar. For both ethnic groups the age

pattern of fertility peaks later than for other groups, which suggests that these two groups have similar traditions regarding the timing of marriage.

Figure 5.1. shows that the age patterns of fertility among the Christian and Muslim Batak in 1980 was suggestive of fast decline if certain conditions changed. This is indicated by the relatively flat curve after the peak child bearing age group is reached. By 1990, the pattern has changed. Figure 5.2. shows that the age curve, after it reaches its peak, declines sharply. The introduction of family planning programs, easily accessible information, higher mobility, and the increased cost of child rearing are probable factors contributing to the change.

As can be seen in Figures 5.3 and 5.4 there was a decline in fertility levels for all of the ethnic groups from 1980 to 1990. In 1980 except for the Christian Batak that peaked in age group 30-34, age patterns of fertility of all ethnic groups peaked in age groups 25-29:this shows that in 1980 the Christian Batak had not only high levels of fertility, but also a long period of childbearing. In 1980, education had little effect on fertility among the Christian Batak. By 1990, age patterns of fertility of all ethnic groups, including the Christian Batak, peaked in age groups 25-29; this suggests that the Christian Batak shortened the childbearing period through some sort of fertility control. As found in the field work the use of permanent types of contraception among the Christian Batak was the highest of all ethnic groups, so there were no births or fewer births than formerly occurred, in the later years of

childbearing in this group. This brought the peak of childbearing to a younger age group.

Table 5.5. The Age Specific Fertility Rates in North Sumatra: 1980-1990 for population with secondary education according to ethnic identity

Year/Age groups 1980	Population					
	Foreign	Muslim Batak	Christian Batak	Javanese	Malay	Total
1980						
15-19	n.a.	0.026	0.005	0.024	0.029	0.015
20-24	n.a.	0.179	0.175	0.223	0.236	0.170
25-29	n.a.	0.276	0.336	0.238	0.271	0.281
30-34	n.a.	0.216	0.358	0.230	0.222	0.233
35-39	n.a.	0.141	0.220	0.103	0.177	0.119
40-44	n.a.	0.085	0.133	0.076	0.039	0.072
45-49	n.a.	0.000	0.082	0.000	0.000	0.025
1990						
15-19	0.005	0.014	0.007	0.016	0.012	0.010
20-24	0.050	0.114	0.132	0.143	0.156	0.112
25-29	0.114	0.204	0.246	0.185	0.211	0.205
30-34	0.077	0.163	0.242	0.159	0.151	0.174
35-39	0.037	0.125	0.137	0.089	0.085	0.092
40-44	0.020	0.044	0.051	0.000	0.027	0.031
45-49	0.000	0.000	0.011	0.000	0.000	0.006

Source: the 1980 and 1990 Census data tapes
Note: n.a. not applicable; the number of cases is too small

As mentioned earlier, because of insufficient cases, the age pattern of fertility among the Chinese ethnic group with secondary education in 1980 can not be drawn: only a small proportion of the Chinese had secondary education in 1980. Even though the Chinese had been exposed to the modern education system since the Dutch colonial era, to pursue a higher level than primary education was not considered necessary for most of them, because most worked in commerce running their own businesses, and not requiring a high education level (personal observation).

Only a small number had professional education, such as medical degrees. Most of the Chinese people in North Sumatra did not regard education as necessary for better socio-economic status. It is only recently that more Chinese have become interested in pursuing higher education, mostly in economic or trade related fields, or in medicine: these are regarded as fields with better economic prospects (personal observation). The increase in the proportion with secondary education makes it possible in 1990 to draw the graph and estimate fertility levels. In 1990, as shown in Figure 5.4, the peak of childbearing of the Chinese ethnic group occurred in the 25 to 29 age group.

Figure 5.3. The ASFR of North Sumatra for population with secondary education according to ethnicity: 1980

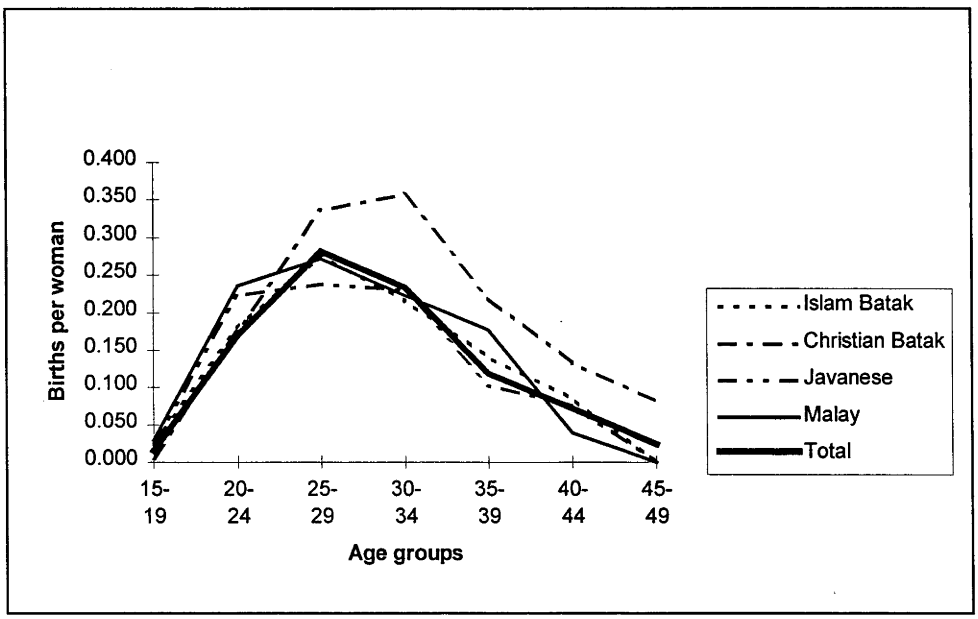
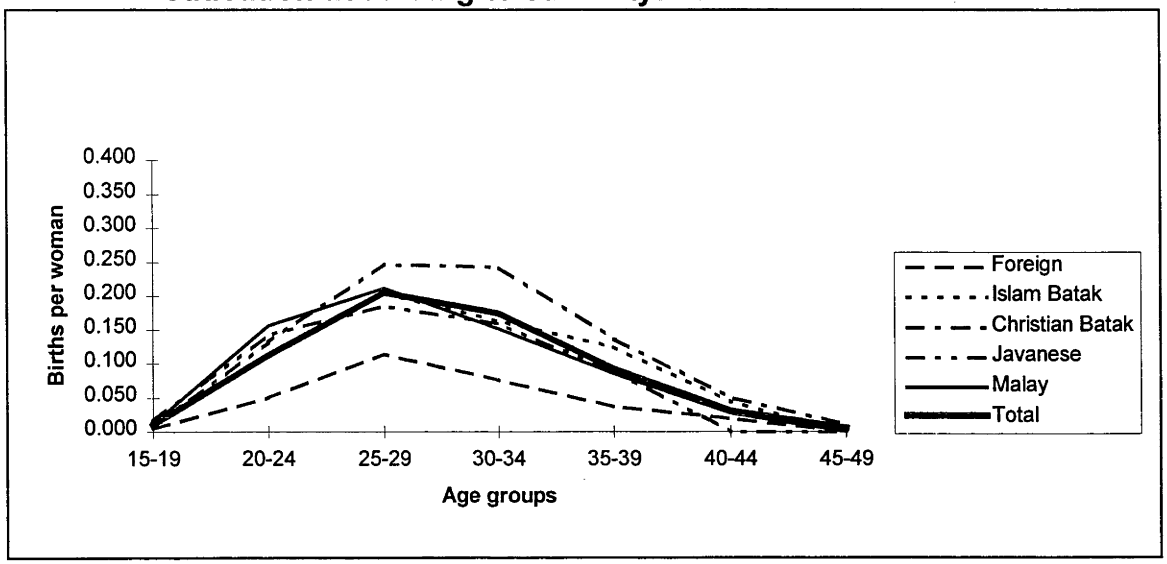


Figure 5.4. The ASFR of North Sumatra for population with secondary education according to ethnicity: 1990



Source: 1980 and 1990 Census data tapes

Unlike those with primary education, the age patterns of fertility among the Christian Batak and the Muslim Batak with secondary education are different. As can be seen in Figures 5.3 and 5.4, the Christian Batak age specific fertility patterns peaked in age group 30-34 years in 1980 and in age group 25-29 by the year 1990. The Muslim Batak had a similar pattern in 1980 and 1990 peaking in the age group 25-29. Aside from the lower levels, there is no strong impact of education on the age pattern of fertility among this ethnic group; traditional factors still had a stronger effect on the pattern than did education.

The same figures show that education level had a stronger effect on the age pattern of fertility for the Christian Batak than the traditions practised in relation to marriage. Field observation showed that an increased proportion of young male Christian Batak especially those with higher education, did not marry their

traditional pre-arranged spouses (*pariban*). This is also related to the increase in the number of young people who pursue tertiary education.

The characteristics of the ethnic groups, the introduction of family planning, and the provision of primary education especially for women may have been important in the decline in fertility in North Sumatra in the period 1980 to 1990. Inter-ethnic competition to obtain better socio-economic status through educational achievement is the factor which makes education important (Hull, 1996: personal communication). The following section examines the changes in marital fertility control and the proportion married in relation to education level among the ethnic groups in North Sumatra from 1980 to 1990. Changes in marital fertility control are observed through the indicator, I_g.

5.3.1. Decline in fertility among women with primary education

As discussed earlier, factors related to marital fertility change are associated with the effort to limit family size within marriage. In the case of North Sumatra, especially in the period observed, the most significant cause of this is the use of modern contraception. The government introduced the family planning program in this province in the mid 1970s. Field work interview to the mothers shows that in the beginning, there was resistance the program from some ethnic and religious groups; it was only after 1980 that the program seems to have progressed and expanded. The factor mainly associated with change in the proportion married is the change in age at first marriage, which in turn may be due to the marital law that

requires minimum ages for brides and grooms; compulsory primary education; or culture and tradition. The extent and change in these factors is examined through the use of Coale indices.

5.3.2. Factors related to marital fertility change

Table 5.6. shows the range of I_g indices in 1980 and 1990 and the changes in that period for women with primary education. In 1980, I_g was very high among the indigenous ethnic groups, especially the Javanese, the Christian Batak, and the Malays. These high indices show that there had been very little or no effort to limit family size among those ethnic groups. Among them, Christian Batak and Javanese had the highest index. Those two ethnic groups also had the highest levels of fertility. This means that the high levels of fertility in 1980 occurring among these ethnic groups were associated with a very low level of contraceptive use.

Table 5.6. Coale indices of marital fertility (I_g), North Sumatra for population with primary education:1980-1990 according to ethnicity

Population	I_g index		Change of I_g
	1980	1990	
Foreign	0.47	0.42	0.05
Muslim Batak	0.54	0.49	0.05
Christian Batak	0.69	0.53	0.16
Javanese	0.69	0.42	0.27
Malay	0.65	0.49	0.16
Total	0.64	0.49	0.15

Source: 1980 and 1990 Census data tapes

In the ten-year period, these ethnic groups experienced a different pace of marital fertility decline. The Chinese and the Muslim Batak had the least change over that period, which indicates that they made little additional effort to limit family size in the period observed and that the use of contraception by these groups did not increase substantially in the ten-year period.

The possible explanation for the Chinese is that the relatively low level of fertility in 1980 was the result of other factors than the use of contraception. This group may have been using other kinds of contraception, such as traditional herbs: field work and personal observation show that the Chinese traditional herbs are widely known in North Sumatra to be used for almost all medical problems, including contraception.

The small change in I_g among the Muslim Batak may have been related to the traditions that still favour large family size; or to the fact that they live in the southern part of North Sumatra, relatively far from the capital of the province. The influence of some of Islamic leaders who were against family planning program, such as use of modern contraception could have been strong. This makes the provision of contraception to those areas more difficult than in other places. Field observation of the areas indicated that only recently had most of them become accessible to the family planning service; some parts of South Tapanuli are not accessible by road.

The Christian Batak, the Malays, and especially the Javanese experienced large declines in marital fertility, as is shown by the large change in the I_g index in Table 5.6. This indicates that those ethnic groups, especially the Javanese, adopted family size limitation through the use of modern contraception, consistent with government efforts to provide contraception. In the early implementation of the family planning program, the provision of contraception was almost free, which hastened the spread of contraceptive use in some places. Personal experience and observation in North Sumatra's plantations, where most of the Javanese live, suggest that the Javanese, especially those with primary education, accepted contraception easily because of their tradition of obedience to their leaders. Once the leaders accept a program, they are followed by the rest of the community. According to the field observation, Javanese mainly use non-permanent types of contraception, such as contraceptive pills, IUD, or injections. These types of contraception were provided by the family planning workers in the beginning of the family planning program in the area. The Malay have had a similar experience but to a lesser extent.

The experience of the Christian Batak is slightly different from that of the Javanese and the Malays. Observation in the field showed that the Christian Batak make more independent decisions about using contraception; the influence of formal or traditional leaders is not as strong. Therefore, the family planning workers approach them in different ways from the Javanese and the Malays; an approach to the individual household is more important for this ethnic group than through

their leaders. At first, there was resistance towards the use of contraception; but once they have decided to accept, they want to use permanent types of contraception such as sterilisation.

Table 5.7 shows the findings for those with secondary education. A large reduction in I_g occurred among the Muslim Batak, the Christian Batak and the Malays. The Javanese had very little or no reduction. This suggests that the Batak and the Malays with secondary education had similar processes of marital fertility decline.

Table 5.7. Coale indices for the change in marital fertility (I_g), North Sumatra for population with secondary education, 1980-1990, according to ethnicity

Population	I_g index		Change of I_g
	1980	1990	
Foreign	n.a.	0.36	n.a.
Muslim Batak	0.63	0.48	0.15
Christian Batak	0.74	0.61	0.13
Javanese	0.60	0.63	-0.03
Malay	0.66	0.53	0.13
Total	0.64	0.49	0.15

Source: 1980-1990 Population Census data tapes

This is likely because most of those with secondary education live in urban areas where the exposure to information about family planning is high. Another possibility is that those groups include many government officials (personal experience as government official in North Sumatra). It is known that most of the government officials have secondary education or higher. The family planning program to limit family size is known to be successful among government officials. The I_g among the Javanese ethnic group with secondary education did not change

much in period observed. This means that the contribution of marital fertility control factors to the decline in fertility remained the same during that period, because the higher the education of the Javanese, the less powerful the role of traditional leaders. Therefore, the success of the government in limiting fertility through the family planning among the Javanese with primary education does not apply to those with secondary education.

The changes in relation to I_g suggest different roles of education in each ethnic group. The increase in education level does not significantly influence marital fertility control for some ethnic groups, especially the Javanese, the Christian Batak, and the Malays, as is shown by the small change in I_g indices for the period 1980 to 1990 for those with secondary education as compared to those with primary education (See Tables 5.6 and 5.7). However, it has quite a significant impact among the Muslim Batak ethnic group. This means that the efforts to limit fertility are more effective among the Javanese, Christian Batak, and Malays with primary education than for those with secondary education, while among the Muslim Batak, the increase in educational level is more important.

5.3.3. Change in Proportion Married

As compared to changes in I_g, there was very little change in I_m across all ethnic groups for women with primary education. This indicates that there is very little change in fertility due to marriage factors, such as age at marriage for women with primary education. The high levels of I_m also show that marriage is not only

universal, but also occurs at relatively young ages for those with primary education in almost all ethnic groups in North Sumatra.

Table 5.8. also shows that there is a slightly unusual trend in I_m among the Chinese ethnic group between 1980 and 1990; the level increased over the period observed. However, the change is small, at about 0.06. There have been a shift to smaller numbers with primary education by 1990 and this smaller group might have been selective of those who married early (see also Table 5.1.).

Table 5.8. Change in Coale indices for the proportion married indicator (I_m) in North Sumatra for population with primary education, 1980-1990, according to ethnicity

Population	I_m index		Change in
	1980	1990	index
Foreign	0.51	0.57	-0.06
Muslim Batak	0.74	0.73	0.01
Christian Batak	0.69	0.66	0.03
Javanese	0.77	0.72	0.05
Malay	0.72	0.72	0.00
Total	0.71	0.70	0.01

Source: the 1980 and 1990 Census data tapes

Most of the change in fertility among women with primary education is related to marital fertility control such as the use of contraception, rather than married proportion factors such as the increase in age at marriage. Women with primary education tend to marry younger than those who attain higher education. Therefore, the intermediate variable that is most related to the fertility decline is the use of contraception. This is supported by the intense family planning campaign, including the readily available contraception in most parts of North Sumatra.

Table 5.9. shows the I_m indicator for women with secondary education. The table shows that the I_m indices are lower than those for women with primary education. This means that, as education increases, fertility will fall because of the fall in the proportion married.

Table 5.9. Change in Coale indices for the proportion married indicator (I_m) in North Sumatra for population with secondary education, 1980-1990, according to ethnicity

Population	I_m index 1980	1990	Change in index
Foreign	n.a.	0.33	n.a.
Muslim Batak	0.53	0.49	0.04
Christian Batak	0.54	0.47	0.07
Javanese	0.55	0.34	0.21
Malay	0.59	0.49	0.10
Total	0.53	0.44	0.09

Source: 1980 and 1990 Census data tapes

The other difference from the primary level education is that the change in I_m over the same period of time is different. The I_m indices did not change much between the censuses for those with primary education, but a higher degree of intercensal change in I_m is found among those with secondary education. The least change occurred among the Muslim Batak ethnic group. There was a dramatic change for the Javanese over the period observed and noticeable change among the Malays and the Christian Batak.

The fertility of those of the Javanese ethnic group with secondary education would have declined because of the married proportion factors, such as increase in age at marriage. The majority of the Javanese ethnic group still had primary education; secondary education became more readily available with socio-economic

development in North Sumatra in the 1980s. Education for women not only directly postpones age at marriage, but also attracts them to work as skilled or professional workers. Consequently, they delay marriage even longer. This occurred also among the Malays and the Christian Batak to a lesser extent.

5.3.4. Components of difference in the decline in fertility

The purpose of this section is to determine the contribution of marital fertility and married proportion factors to the decline in fertility in North Sumatra for the period 1980-1990; see Tables 5.10. and 5.11. Table 5.10 shows that for those with primary level of education, most of the decline was attributable to marital fertility factors, such as the use of modern contraception. This is shown by the higher level of I_g indices as compared to I_m indices in all ethnic groups. The Javanese had the highest change in I_f, followed by the Christian Batak and the Malays; the Muslim Batak and the Chinese had the smallest change.

Table 5.10. The change in Coale indices for general fertility change indicator and its component of difference for women with primary education in North Sumatra: 1980-1990 according to ethnicity

Population	I_f Index		Change	Components of I_f	
	1980	1990	of I_f	I_g	I_m
Foreign	0.24	0.24	0.00	0.03	-0.03
Muslim Batak	0.40	0.36	0.04	0.04	0.01
Christian Batak	0.48	0.35	0.13	0.11	0.02
Javanese	0.53	0.30	0.23	0.20	0.03
Malays	0.47	0.35	0.12	0.12	0.00
Total	0.45	0.34	0.11	0.11	0.01

Source: 1980 and 1990 Census data tapes

It is clear that marital fertility control made an important contribution to the decline in fertility for those with primary education in North Sumatra. The large changes in I_f due to the marital fertility control among the Javanese and Christian Batak with primary education suggest that the change in fertility behaviour of these ethnic groups is an integral part of the decline in the fertility in North Sumatra: these groups had the highest fertility in the past, as can be observed for 1980, and the majority of them had primary education.

Family planning workers in the field told the researcher that it was relatively easy to introduce family planning to the Javanese community, who are so obedient to their leaders that they are almost never resist any government program introduced to them, including family planning. This applied especially among those with limited education or at least primary education.

Table 5.11 shows that for the secondary education level, the variation in I_f change is very small: all of the ethnic groups with secondary education experienced a similar fertility decline. However, there was variation in the components of the decline: the I_g and I_m components of the decline for Christian Batak and for Malays are similar; the Muslim Batak fertility decline is more attributable to I_g than I_m, while for the Javanese, the opposite is the case.

Table 5.11. Change in Coale indices for general fertility change indicator and its component of difference for women with secondary education in North Sumatra, 1980-1990, according to ethnicity

Population	I_f Index		change	Components of I_f	
	1980	1990	of I_f	I_g	I_m
Foreign	n.a.	0.12	n.a.	n.a.	n.a.
Muslim Batak	0.33	0.24	0.10	0.08	0.02
Christian Batak	0.40	0.28	0.12	0.07	0.05
Javanese	0.33	0.21	0.12	-0.01	0.13
Malay	0.39	0.26	0.13	0.07	0.06
Total	0.34	0.22	0.12	0.07	0.05

Source: 1980 and 1990 Census data tapes

The similar contributions in I_g and I_m to the decline in fertility among the Christian Batak and the Malays with secondary education indicates that the decline is attributable both to the use of contraception and to the increase in age at marriage. Among the two, the I_g component is slightly higher than the I_m: the contribution of marital fertility control is slightly larger than the proportion married change factor.

Field work observation suggested that the higher educated Christian Batak and Malays took the decision to use contraception through the family planning program more because of the concern of the disadvantage of having many children than because of traditional factors. Those with high education think that having many children is more disadvantageous than advantageous.

The decline in fertility of the Javanese with secondary education was more attributable to the increase in age at marriage. This is different from the finding among those with primary education. This is because of characteristics of this ethnic group. The Javanese with low socio-economic status, including a low

educational level, tend to follow the decision of their leaders. The leaders can be the formal or informal leaders. Through those leaders the family planning workers promote the use of contraception.

As education level increases, it changes the way fertility declines among this ethnic group. Marital fertility control is no longer important; the indirect effect of education in increasing age at first marriage becomes more important. This is why fertility decline among the Javanese with secondary education level is more attributable to the factors such as the increase in age at marriage than marital fertility control.

From those findings, it is shown that for the Muslim Batak, increase in education strengthened the role of I_g. The opposite results are found for the other ethnic groups: the Javanese, the Christian Batak and the Malays. The increase in education for these ethnic groups weakened the role of I_g, but strengthened the role of I_m.

5.4. Conclusion

In general, fertility declines as education level increases. There has been a decline in the proportion of women with primary education in all ethnic groups, which means that there has been an improvement in the educational level of the population in North Sumatra for the period 1980 to 1990. The largest increases in education occurred among the Chinese ethnic group. The percentage of the

Javanese with secondary education increased from very low to a moderate level. In relation to the decline in fertility, the change in education led to an increase in age at marriage and a shortening of the childbearing period among the Javanese and Chinese women.

The role of education in the decline in fertility varies for each ethnic group. I_g is an important contributor to fertility decline for the Javanese, Christian Batak, and the Malays with primary education. The role of I_g is less important for those with secondary education for whom the decline in fertility is more attributable to the change in I_m, such as the change in age at first marriage. For the Muslim Batak, the role of I_g for those with primary education is not as strong as for those with secondary education.

The findings suggest that the traditions and culture of each ethnic group have been important in the decline in fertility in North Sumatra between 1980 and 1990. Education has influenced the way each ethnic group responds to the socio-economic development in North Sumatra, The way in which fertility has declined has been different for each group.

CHAPTER 6

THE EFFECTS OF ECONOMIC DEVELOPMENT ON THE FERTILITY DECLINE IN NORTH SUMATRA

6.1 Introduction

There are four administrative regions in North Sumatra with different socio-economic characteristics, known as the North Sumatra development regions; regions I and II are less developed than regions III and IV. This chapter examines whether economic development has contributed to the decline in fertility levels in North Sumatra by examining the impact on fertility of these regions.

As described in Chapter 2, the regions are actually groups of sub-provincial administrative divisions consisting of *kabupaten* and *kotamadya* that are close to each other. Region I is on the west coast of North Sumatra and Region II is in the hilly areas in the central part of the province. Some of this land is known to be infertile, not suitable for cultivation of crops; the infertile land mainly in the hilly areas, such as the that surrounding Lake Toba. Medan, the provincial capital, is in region III, which has been developed since the colonial era and is considered the most developed region in the province. A number of plantations were originally

developed in this region, but some of the land has been converted to other functions including urban housing and new industrial areas. Region IV is in the southern part of the East Coast of North Sumatra. The expanded plantation areas are located in regions II and IV.

6.2. Regional variation and its significance for levels and trends in fertility

Table 6.1. shows that all of the regions in 1980 had Total Fertility Rates of about five to six children per woman. The Coale Indices (I_f) also show that fertility was in the early stage of transition in all of the regions in that year (see Table 6.2). In 1980, there were slight differences in the levels of fertility across the regions. Regions IV and II had the highest levels of TFR, and regions I and III had similar levels. This indicates that some fertility transition had occurred in regions I and III slightly earlier than in the other two regions.

Table 6.1. The decline in Total Fertility Rates in North Sumatra, 1980-1990, according to region

Population	TFR		decline
	1980	1990	
Region I	5.27	4.17	1.10
Region II	5.97	4.26	1.71
Region III	5.31	3.35	1.96
Region IV	6.05	4.36	1.69
Total	5.68	3.73	1.95

Source: the 1980 and 1990 Census data tapes

The earlier fertility transition in region III is likely to be associated with the level of socio-economic development in that region. Region III, with its centre in Medan, has been developed since the Dutch colonial time, and is therefore characterised

by better urban infrastructure, such as schools, housing, electricity, and communications. More importantly, the family planning program in North Sumatra started in this region. Nevertheless, as can be seen in the table, the TFR in region III was less than one child below the TFRs in the other regions.

The other region that had an earlier start to the fertility transition is region I; its low Total Fertility Rate is less likely to be related to socio-economic development, it is the region most remote from the centre of development in region I. Some parts of region I are still difficult to reach by road: field observation indicated that even in recent times, family planning workers have had difficulties reaching clients because of accessibility problems. Therefore, other factors such as ethnicity may have been related to the earlier transition in region I. Most of the people who live in region I are Muslim Batak. As noted in Chapters 4 and 5, the Muslim Batak were characterised by a slightly earlier fertility transition as observed in 1980.

The later start to the fertility transition in regions II and IV may be due to the lower level of socio-economic development as compared to region III. However, this is not consistent with the lower fertility in region I, so the most likely factor related to 1980 fertility levels outside region III is ethnicity. Most of the Javanese and the Christian Batak live in the two higher-fertility regions: these ethnic groups had the highest fertility levels in 1980, which explains why the fertility in these two regions was the highest in 1980.

In 1990, region III had the lowest fertility level, because not only did this region have the lowest fertility level in 1980, but also its fertility declined more rapidly than the other regions in the period 1980 to 1990. In 1990, the other three regions had similar levels of fertility. The resulted from a combination of a faster decline in region II and IV that previously had the highest fertility levels and a slower decline in region I which previously had the lowest level of fertility. This indicates that the path of the decline is different for each region.

In the period 1980-1990, three regions had major declines in fertility: regions III, IV and II. Region I experienced the slowest decline. (see Tables 6.1 and 6.2). Two factors may have been involved in these declines: socio-economic development and ethnicity. Fertility decline in region III is likely to be associated more with socio-economic development, while decline in the other regions is related more to the characteristics of the ethnic groups living in the areas.

Table 6.2. Change in Coale indices for general fertility (I_f) in North Sumatra, 1980-1990, according to region

Population	I_f Index		Change in I_f
	1980	1990	
Region I	0.40	0.32	0.08
Region II	0.43	0.32	0.11
Region III	0.41	0.26	0.15
Region IV	0.47	0.35	0.12
Total	0.42	0.28	0.14

Source: 1980-1990 Population Censuses data tapes

As region III is the centre of development, a higher proportion of people living there are educated and have better access to family planning program than in other regions. Most of the Chinese, who have the lowest fertility, live in this region.

As was shown in Chapter 4, the largest declines in fertility by ethnicity occurred among the Javanese followed by the Christian Batak. The rapid declines for these ethnic groups are likely be associated with the relatively large decline in fertility in regions II and IV. The moderate decline in fertility levels in region I has the same explanation, because fertility decline among the Muslim Batak who predominant in this region was also moderate.

Table 6.3. Age Specific Fertility Rates in North Sumatra, 1980-1990, according to region

Year/Age groups	Population				
	Region I	Region II	Region III	Region IV	Total
1980					
15-19	0.043	0.029	0.054	0.065	0.048
20-24	0.228	0.245	0.265	0.313	0.261
25-29	0.284	0.305	0.266	0.324	0.288
30-34	0.215	0.284	0.222	0.212	0.235
35-39	0.161	0.179	0.148	0.162	0.160
40-44	0.080	0.103	0.075	0.088	0.085
45-49	0.043	0.036	0.032	0.046	0.038
1990					
15-19	0.022	0.016	0.025	0.040	0.023
20-24	0.157	0.170	0.150	0.213	0.162
25-29	0.211	0.244	0.195	0.227	0.209
30-34	0.212	0.212	0.161	0.210	0.179
35-39	0.145	0.141	0.096	0.124	0.113
40-44	0.067	0.056	0.033	0.044	0.047
45-49	0.019	0.012	0.010	0.014	0.013

Source: the 1980 and 1990 Census data tapes

As can be seen in table 6.3 and Figure 1, in 1980 the age specific fertility rates of the four regions all show a peak in age group 25 to 29 years. In this sense, they are similar. However, the slopes of the decline after the peak are across the four regions.

Figure 6.1. The ASFR of North Sumatra according to ethnicity: 1980

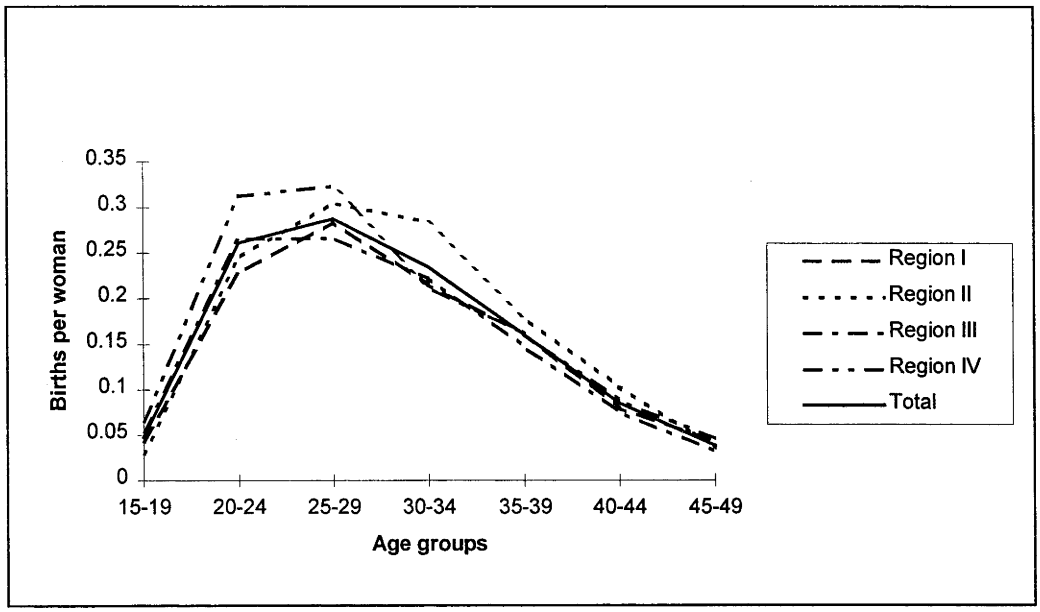
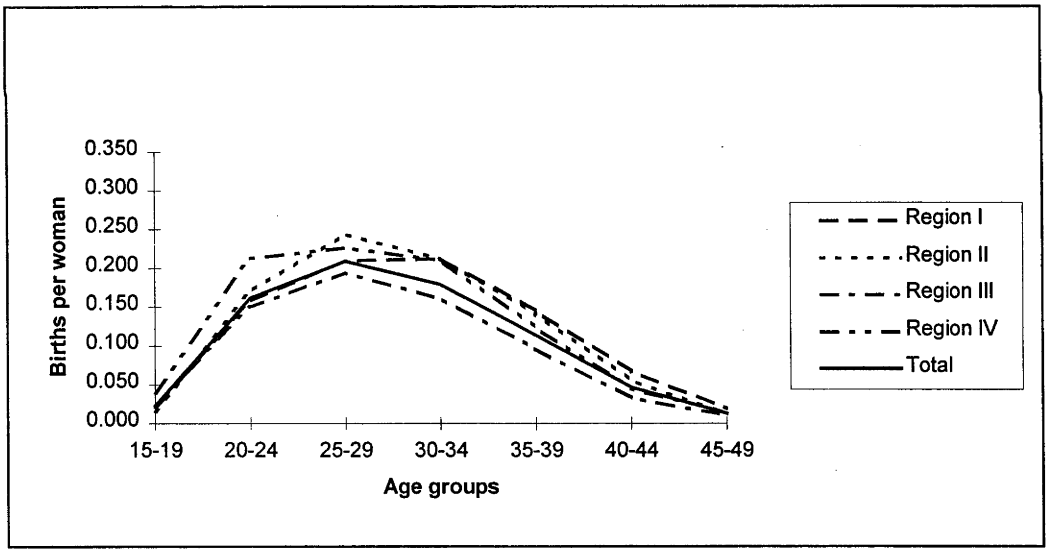


Figure 6.2. The ASFR of North Sumatra according to ethnicity: 1990



However, as can be seen in Table 6.3. and Figure 6.1, by 1990 the steepness of the slope after reaching the peaks had changed. The slopes of the ASFR graph for region II and region IV were flatter than those in 1980 making the patterns of ASFR for the four regions almost similar.

6.3. Factors related to fertility decline in the regions

Two components of fertility decline are further observed: marital fertility and the proportion married using Coale Indices. In 1980, the I_g calculations show that region I had the lowest level; all other regions had similar levels. This indicates that marital fertility control was higher in region I than the other regions even though at a very moderate level.

Since the family planning program had not then been established in region I, the lower level of I_g may have been related to other factors, such as ethnicity. Most of the Muslim Batak, especially the Mandailing and Angkola Batak, live in this region. The fertility level of this ethnic group was low initially in 1980, possibly because of voluntary sexual abstinence caused by separation while the husbands work in the city; or through the use of traditional contraception such as herbs (*jamu*).

Table 6.4. Coale indices for the change in marital fertility (I_g), North Sumatra: 1980-1990 according to region

Population	I_g index		Change of I_g
	1980	1990	
Region I	0.57	0.51	0.06
Region II	0.63	0.54	0.09
Region III	0.62	0.49	0.13
Region IV	0.64	0.54	0.10
Total	0.64	0.49	0.15

Source: the 1980-1990 Population Census data tapes

The lower level of fertility in region III, the most socio-economically advanced region, was not associated with marital fertility control: this is indicated by the

similar levels of I_g in regions II, III, and IV. The difference in fertility levels is more likely to be associated with the socio-economic background of people living in region III. Higher educational attainment of women, for instance, has caused the delay in age at first marriage that leads to a lower fertility (see Table 6.5.)

In the 1980s, regions showed different decreases of the I_g index. Region III had the largest reduction, followed by regions II and IV. Region I had the smallest change. The decline in region III is likely to be associated with acceptance of contraception due to higher educational background, easier access, and more availability of modern contraception in the centre of development. In regions II and IV, the decline is associated with the acceptance of modern contraception by most of the ethnic groups living in these regions, the Javanese and the Christian Batak. This shows the importance of ethnicity in the regions.

In Chapter 4, it was shown that the Javanese experienced the largest decline in I_g in the 1980s. Many Javanese live on plantations in regions II and IV. This is combined with the use of permanent contraception found as the preference of the Christian Batak who live in region II.

The proportion-married indicator in 1980 was lowest in region III followed by regions II and I. The highest level of the I_m index occurred in region IV (see Table 6.5.). This is consistent with the previous findings showing that the fertility level in

region III is more influenced by the better socio-economic conditions while, in other regions, fertility is more related to the cultures of the ethnic groups in these areas.

Table 6.5. Change in Coale indices of the proportion married indicator in North Sumatra, 1980-1990, according to region

Population	I_m index		Change of
	1980	1990	index
Region I	0.70	0.62	0.08
Region II	0.68	0.60	0.08
Region III	0.66	0.54	0.12
Region IV	0.74	0.65	0.09
Total	0.66	0.58	0.08

Source: the 1980-1990 Population Censuses data tapes

The relationship between marriage and ethnicity can be seen in the relatively low I_m index in region II where most Christian Batak live, the highest index being in region IV where most of the Javanese live, and the relatively moderate level in region I where most Muslim Batak live. Hence the marriage patterns of the different ethnic groups lead to the differences observed for regions.

As expected, region III experienced the largest decline in I_m, which indicates that the factors related to the proportion married, such as the age at first marriage, had the greatest effect in region III. Together with other factors, socio-economic development was involved in the decline in the proportion married in region III. Similar explanations apply to region II and IV where most of the Javanese and the Christian Batak live. This is consistent with the findings in the earlier chapters that the Javanese and the Christian Batak who mostly live in region II and IV had experienced the largest decline in the level of I_m.

The components of difference of the fertility decline are observed through decomposition of I_f into its components, I_g and I_m: the results are shown in Table 6.6.

Table 6.6. Change in Coale indices for general fertility change indicators in North Sumatra, 1980-1990, according to region

Population	I_f Index		change	Components of I_f	
	1980	1990	of I_f	I_g	I_m
Region I	0.40	0.32	0.08	0.04	0.04
Region II	0.43	0.32	0.11	0.06	0.05
Region III	0.41	0.26	0.15	0.08	0.07
Region IV	0.47	0.35	0.12	0.07	0.05
Total	0.42	0.28	0.14	0.09	0.05

Source: 1980-1990 Population Censuses data tapes

As shown in Table 6.6, the two components, I_g and I_m, have contributed almost equally to the change for fertility in all four regions. However, I_g seems to have contributed slightly more than I_m indices. This means that marital fertility control, such as the use of modern contraception, has slightly more contributed to the decline of fertility than proportion married. The increase of modern contraceptive use resulted from government program and promotion is likely to be the explanation to this finding.

6.4. Conclusion

Fertility levels vary slightly according to regions; the variation between the regions is attributable to different factors. Fertility levels in region III are likely to have been influenced by the socio-economic characteristics of the region. Fertility levels in

the other regions are more associated with the characteristics of the ethnic groups in the regions.

The fastest decline in fertility occurred in the most developed area. Regions whose population consists of Javanese and Christian Batak also experienced substantial fertility decline in the time period observed. The slowest decline in fertility was in the region where the Muslim Batak (Mandailing Batak and Angkola Batak) live.

The decline in fertility in region II, III, and IV is attributable more to marital fertility control factors, such as the use of modern contraception, than proportion married factors. The factor that is likely to influence the decline is the government's extensive family planning program. Fertility decline in region I was equally the result of proportion married and marital fertility control factors.

CHAPTER 7

CONCLUSION

The evolution from high to low fertility found in North Sumatra differs from the experience in the European countries because it occurred: (1) at a relatively low level of socio-economic development; (2) in a relatively short period; (3) in an environment where modern contraception is readily available; (4) in a society where the family system is stronger, and in some ethnic groups, such as the Christian and Muslim Bataks, intergenerational obligations are greater; (5) where the status of women is low; (6) where primary education is widespread; (7) in a less urbanised society but one with greater exposure to the world economic system; (8) with better communication and transportation facilities; (9) with a lower level of infant mortality at the onset of fertility decline; and (10) where marriage is universal. In addition, pre-transition fertility rates were lower than the case in Europe. Most of these findings confirm the differences between the Asian and European fertility transitions indicated by McDonald (1993).

There are also similarities with the European transition: (1) no particular settings of socio-economic variables facilitated the decline; (2) the decline is earlier among the educated and those who work in the modern industrial sector; (3) it tends to occur simultaneously among groups sharing the same culture; (4) there were exceptions to the postulation of a relationship of the fertility decline with

modernisation factors; and (5) cultural determinants of fertility change were important.

The decline of fertility in North Sumatra is also different from the experience in other parts of Indonesia, such as Java where the decline occurred in a relatively homogenous society. Lack of communication and linkages between the two groups, is one of the reasons why the fertility level among the Javanese in North Sumatra in the 1980s was much higher than that of Java.

Traditional leaders together with group pressures in the society played an important role in the change of fertility behaviour particularly among those with primary education. The success of the introduction of family planning to Javanese in North Sumatra with primary education, for instance, was brought about by the influence of the traditional leaders together with group pressures. This pattern also occurred among the Christian Bataks and the Malays but to a lesser extent. On the other hand, the possible resistance to family planning among traditional leaders and weaker group pressures seemed to have been associated with the slow change of fertility behaviour among the Muslim Batak. There is no strong indication of the influence of leaders or group pressure among the Chinese in North Sumatra, whose society is more individualistic.

The effect of education is different among the ethnic groups indicating the stronger role of specific ethnic characteristics. The fertility decline was substantially greater

among the Javanese ethnic group for those with primary education as compared to those with secondary education. In contrast, fertility decline among the Christian Batak for those with secondary education was greater than for those with primary education. This also applied to Muslim Batak to a lesser extent. For the Malays, there was no substantial difference between the two levels of education in regard to fertility decline.

Geographic and socio-economic regions did not have a strong relationship with the decline of fertility in North Sumatra in the 1980s. Rather it was the type of ethnic groups who live in the area which had the greater impact on the level of fertility. However, the more urbanised and developed region showed a slightly lower level of fertility than the other regions.

Factors examined in this study in direct relation to the decline of fertility in North Sumatra are categorised into two: the proportion married factor and fertility control. In North Sumatra, the proportion-married factor is strongly associated with age at first marriage, while the fertility control factor is mainly associated with the use of modern contraception. The relative impact of these factors upon the decline of fertility levels varies substantially across different ethnic groups and different educational backgrounds.

The declines of fertility among the Christian Batak and the Javanese were more attributable to the proportion married factors, such as the rise in age at first

marriage, while the fertility of the Chinese, the Muslim Bataks and the Malays was affected by both factors equally. The variation is greater again after controlling for education. Among those with primary education, the fertility declines of the Javanese, the Malays, the Christian Batak and the Muslim Batak were associated more with fertility control factors, such as the use of modern contraception rather than the proportion married factors. These relative contributions remained the same for the Muslim Batak, Christian Batak and the Malays with secondary education but to a lesser extent. Fertility decline among the Javanese with secondary education, however, was influenced more by the proportion-married factors, such as the rise of age at first marriage.

In conclusion, this study of the fertility transition in one province of Indonesia has shown that there are many differing paths to fertility decline. For some groups in this province, increase in age at first marriage made a greater contribution to fertility decline than use of modern contraception, while for other groups the reverse was true. Ethnicity seems to have played an larger part in the variation of paths to fertility decline than did modernisation factors such as education and economic development. Indeed, the variations in the patterns of fertility decline among different ethnic groups in North Sumatra can be seen as resulting from the unique set of circumstances that eventuates when a particular traditional culture comes in contact with more universal, modernisation factors.

SUMATERA UTARA

(FIG. 1. NORTH SUMATERA)

KABUPATEN	IBUKOTA KABUPATEN DAERAH TINGKAT II
1. ASAHAN	TANJUNGBALAI
2. DAIRI	SIDIKALANG
3. DELI SERDANG	LUBUKPAKAM
4. KARO	KABANJAHE
5. LABUANBATU	RANTAUPRAPAT
6. LANGKAT	STABAT
7. NIAS	GUNUNGSITOLI
8. SIMALUNGUN	PEMATANGSIANTAR
9. TAPANULI SELATAN	PADANGSIDIMPUAN
10. TAPANULI TENGAH	SIBOLGA
11. TAPANULI UTARA	TARUTUNG

KOTAMADYA	KOTA ADMINISTRATIP
BINJAI	KISARAN
MEDAN	PADANGSIDIMPUAN
PEMATANGSIANTAR	
SIBOLGA	
TANJUNGBALAI	
TEBINGTINGGI	

0 10 20 30 40 50 Km

DAERAH ISTIMEWA ACEH

SUMATERA BARAT

RIAU

PULAU NIAS

KEPULAUAN BATU

TELUK TAPANULI

I N D O N E S I A

S E L A T

S A M U D E R A

Appendix

The percentage of women aged 15 to 49 according to ethnicity and education in North Sumatra, 1980 and 1990

	1980		1990	
	Primary	Secondary	Primary	Secondary
Foreign				
15-19	70.3	29.7	30.3	69.7
20-24	71.4	28.6	34.4	65.6
25-29	72.6	27.4	48.0	52.0
30-34	72.9	27.1	57.9	42.1
35-39	72.0	28.0	60.5	39.5
40-44	82.8	17.2	60.7	39.3
45-49	88.4	11.6	68.7	31.3
Total	73.5	26.5	48.6	51.4
Muslim Bataks				
15-19	83.3	16.7	55.3	44.7
20-24	83.2	16.8	59.7	40.3
25-29	86.2	13.8	72.6	27.4
30-34	88.3	11.7	79.9	20.1
35-39	91.9	8.1	85.8	14.2
40-44	92.7	7.3	87.2	12.8
45-49	95.0	5.0	90.2	9.8
Total	86.5	13.5	71.1	28.9
Christian Bataks				
15-19	72.5	27.5	44.8	55.2
20-24	72.3	27.7	42.2	57.8
25-29	76.4	23.6	59.6	40.4
30-34	81.5	18.5	69.1	30.9
35-39	83.7	16.3	73.3	26.7
40-44	84.5	15.5	78.2	21.8
45-49	94.4	5.6	81.2	18.8
Total	77.6	22.4	59.2	40.8
Malays				
15-19	81.0	19.0	47.1	52.9
20-24	80.0	20.0	55.0	45.0
25-29	79.9	20.1	71.8	28.2
30-34	79.9	20.1	76.5	23.5
35-39	85.6	14.4	78.3	21.7
40-44	89.5	10.5	79.6	20.4
45-49	93.7	6.3	83.9	16.1
Total	82.0	18.0	64.7	35.3
Javanese				
15-19	95.4	4.6	67.6	32.4
20-24	95.5	4.5	76.7	23.3
25-29	96.6	3.4	93.1	6.9
30-34	97.5	2.5	96.4	3.6
35-39	97.6	2.4	95.7	4.3
40-44	98.1	1.9	96.6	3.4
45-49	99.6	0.4	98.2	1.8
Total	96.3	3.7	84.7	15.3

Source: the 1980 and 1990 Census data tape

Glossary

Maranak sampulu pitu, marboru sampulu onom is part of a folk rhyme of the Batak in general, particularly the Toba Batak people, normally spoken at a wedding. According to Castles (1974:11) the complete verse is as follows:

Laklak di ginjang pintu
Singkoru tagolom-golom
Maranak sampulu pitu
Marboru sampulu onom

the two first lines have no meaning but rhyme with the next two lines mean 'may the bride and groom have seventeen sons (*maranak sampulu pitu*) and sixteen daughters (*marboru sampulu onom*)'. According to Ginting (1985:30), the number is only figurative, but means that the Batak prefer a family as large as possible.

Bahasa Indonesia = Indonesian national language that is derived from Malay.

Batak Karo is an ethnic group originally comes from the Karo areas. However, some of them have migrated to other parts of North Sumatra, or even farther away. Most of them speak the Batak Karo dialect.

Daerah Istimewa Aceh (Aceh Special Region) is one of Indonesia's special regions. The other two are Indonesian capital special region Jakarta (*Daerah Khusus Ibukota* or DKI), and Yogyakarta Special Region (*Daerah Istimewa Yogyakarta*).

Dipestakan is a passive form of 'to arrange wedding celebration'

Dukun bayi (traditional birth attendant) is a woman whose job is to deliver babies. In most cases they do not have formal education, but the Indonesian government through the Department of Health provides informal training to some of them. Some of them also illegally induce abortions which in Indonesia is illegal.

Dukun means traditional healers. It can refer to either spiritual or physical healers.

ekonomi = 'self finance capability'. This term is normally associated with household finance.

Every child brings its own fortune (*setiap anak membawa rejekinya sendiri*) is a common Indonesian saying which means that the number of children in

a household is not related to the capability to support them. This is a kind of norm in some Indonesian societies that favour large family size. Hull (1974) found similar norms in Javanese culture.

Huta Bayu Raja *kecamatan* is in Simalungun *Kabupaten*; Toba Batak and Javanese ethnic groups live there.

Javanese in North Sumatra are the Javanese people that migrated to North Sumatra during the Dutch colonial times. The majority of them still speak the Javanese language. However, the dialect is slightly different from the Javanese dialect spoken in Java. The migration to North Sumatra from Java began as early as the beginning of the 20th century. It was the policy of the Dutch colonial government to develop plantations in North Sumatra with contract labour, commonly called as '*kuli kontrak*' or 'contract coolies'.

Kabupaten (regency) is an administrative division below province level where most of the areas are rural.

Kabupaten, also known as regency, is a sub-province administrative area where most areas are categorised as rural.

Kampung nelayan (fishermen's village) is a type of village in North Sumatra where the inhabitants are mostly fishermen. They are mostly the Malay people. It is also associated with poverty.

Kawin lari a way of marriage not following the procedures of a traditional wedding. It is practised when the groom's side is not capable of financing the wedding.

Kecamatan (district) is an administrative division below *Kabupaten* or *Kotamadya* level.

Kecamatan is a sub-*kabupaten* or *kotamadya* administrative area.

Kotamadya (municipality) is an administrative division below province level where most of the areas are urban.

Kotamadya also known as municipality, is a sub-province administrative area where most areas are categorised as urban.

Mandailing Batak originally come from South Tapanuli regency. Originally they have a similar culture to the Toba Batak, but they are strongly influenced by Muslim which is the religion of most of them.

Maranak sampulu pitu, marboru sampulu onom is part of a folk rhyme of the Batak in general, particularly the Toba Batak people, normally spoken at a wedding. According to Castles (1974:11) the complete verse is as follows:
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Outer Islands: a term used by many Indonesianists that refers to the Islands or areas outside Java and Bali. Indonesians, however, prefer to use the term 'luar Jawa dan Bali'.

Padang Sidempuan Barat *kecamatan* is in South Tapanuli *Kabupaten*; Mandailing Batak ethnic groups live there.

Pasangan Usia Subur or *PUS* are the couples where the wives are in reproductive age groups, in this case aged 15 to 49 years old. This term is sometimes translated as 'eligible couples' which is misleading.

Penimbangan is an activity in *Posyandu*, and means weighing the babies. However, it refers to all activities provided in *Posyandu* such as weighing babies, immunisation, nutritional improvement program.

Percut Sei Tuan *kecamatan* is in Deli Serdang *Kabupaten*; Malay and Javanese ethnic groups live there.

PLKB : *Petugas Lapangan Keluarga Berencana* (family planning field worker)

Pos Pelayanan Terpadu or *Posyandu* is integrated service post, a broadened program from the weighing post. In this post nutritional promotion for children under five, immunisation, and baby or child weighing are performed. Mothers and children come to the post according to the opening schedules. The Posyandu staff provide nutritious food that is funded by the members (self financed). In North Sumatra most of them do not have permanent locations.

Posyandu = *Pos Pelayanan Terpadu* (Integrated Service Posts) is an active community involvement in health and Family Planning services which are established and administered by the community with the technical support of the public health centre staff of the Indonesian government. (Demographic and Health Survey, 1992: p 5).

Pusat Kesehatan Masyarakat or *Puskesmas* is community health centre. The Indonesian government established at least one *Puskesmas* in every *Kecamatan* (sub-district). In some *kecamatan* they have sub-*Puskesmas*, or commonly known as *Puskesmas Pembantu* that facilitate a simple health service for the people.

Putra Jawa kelahiran Sumatra (Sumatran born Javanese youth) is a polite term for the descendants of the contract coolie in North Sumatra. The other term with similar meaning is *Jawa Deli* which is derogatory.

Tanah Karo (Karo land) = the areas approximately in the current Karo regency. This term is usually used by the Karo people to refer to their original place.

The Malays are one of native ethnic groups living in North Sumatra, belonging to a larger group that lives in the eastern coast of North Sumatra. They are similar to the Malays in Malaysia. In the past the Malays had kingdoms in North Sumatra. According to Sinar (1994), the Malays in North Sumatra are part of the Malay people that live in Southern Thailand, East and West Malaysia, Singapore, Brunei, West Kalimantan, Temiang (East Aceh), Eastern coast of North Sumatra, Riau, Jambi, and coastal Palembang.

The Toba Batak are one of the ethnic groups that live in North Sumatra, originally from the area surrounding Lake Toba. This group have strong patrilineal kinship, the majority are Christians, the youth tend to migrate out of their original place in North Tapanuli regency.

Tiga Raja *kecamatan* is in Simalungun *Kabupaten*; Toba Batak ethnic groups live there.

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