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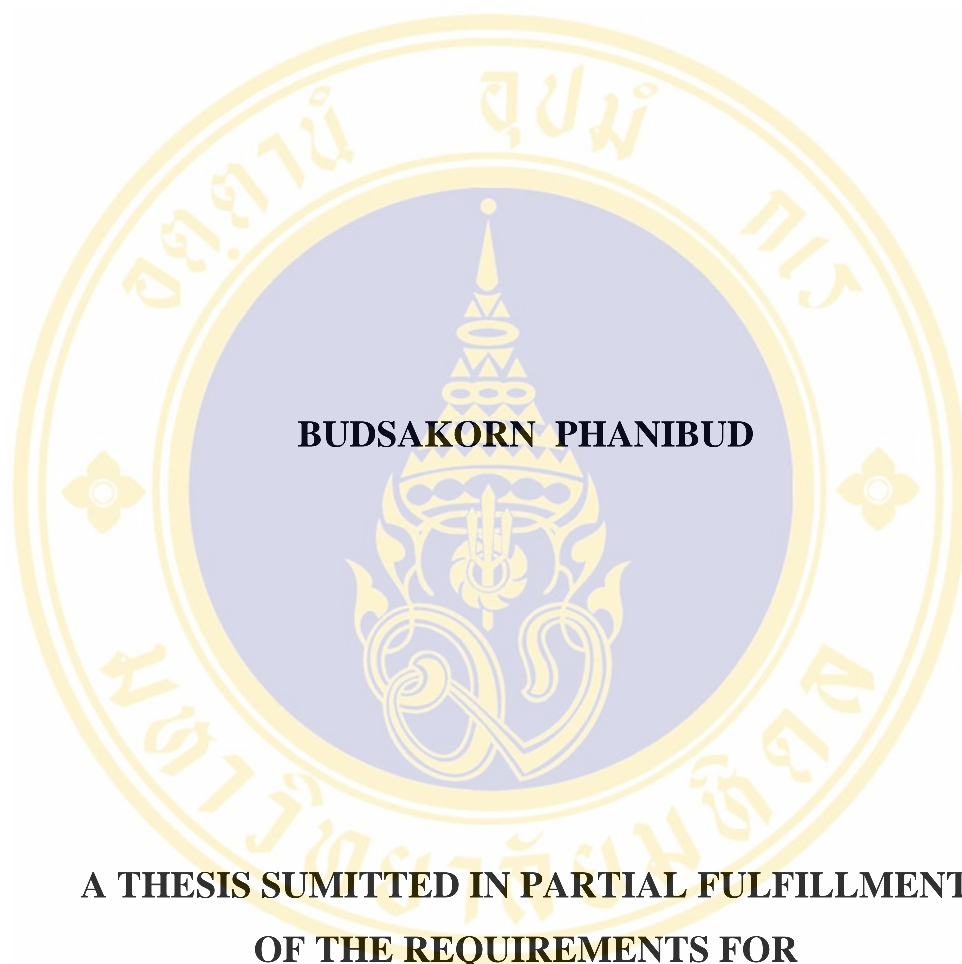

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2007

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Thesis

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FERTILITY DIFFERENTIAL AMONG ETHNIC GROUPS IN HIGHLAND AREA IN KANCHANABURI DSS, THAILAND

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ABSTRACT

This research studied a sample group of 2,418 married women of reproductive age of 15-49 from the Thai, Burmese, Mon, and Karen ethnic groups who resided in highland areas of Kanchanaburi province. The purpose of this study was 1) To study the pattern and the level of fertility of highland women of different ethnic groups and; 2) To study factors which identify the fertility of each ethnic group, by using secondary data from the 4th Kanchanaburi Population Demographic Surveillance System in 2003 conducted by the Institute for Population and Social Research (IPSR), Mahidol University.

Research results showed that highland women were Thai (60 percent), Burmese (7.9 percent), Mon (12.4 percent) and Karen (19.6 percent). The majority of them was in the age group of 30-39 and most had their first marriages at the age of 18. Family structure was a nuclear family rather than an extended family. Two-thirds of the Burmese, Mon, and Karen women were uneducated. The majority of them worked in agriculture with a low economic status. Of those who owned land, the average size of landownership was approximately 30 *Rai*. Moreover, 86.2 percent used to have contraception and the first birth control method used was contraceptive pills. Each ethnicity had a similar pattern of age-specific fertility rate in which the highest rate occurred between 20 and 24 years old and would gradually decline afterwards. However, Thai and Burmese women had lower age-specific fertility rate and the age-specific fertility rate ended earlier compared to Mon and Karen women. Average fertility of highland women was 3.44. Thai women had the lowest level of 3.00, followed by Mon women (3.19), Burmese women (3.75) and Karen women (4.80). After conducting multiple regression analysis, it was found that important factors affecting fertility level of highland women in Kanchanaburi were ethnicity, age, age at first marriage, number of infant mortalities and stillbirths. On the other hand, social factors and economic factors rarely had an effect on fertility.

KEY WORDS: FERTILITY DIFFERENTIAL/ETHNIC GROUPS/
KANCHANABURI DSS

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ความแตกต่างของภาวะเจริญพันธุ์สตรีต่างชาติพันธุ์บนพื้นที่สูงในพื้นที่เฝ้าระวังทางประชากร กาญจนบุรี ประเทศไทย (FERTILITY DIFFERENTIAL AMONG ETHNIC GROUPS IN HIGHLAND AREA IN KANCHANABURI DSS, THAILAND)

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บทคัดย่อ

การศึกษานี้เป็นการศึกษากลุ่มชาติพันธุ์ไทย พม่า มอญ กะเหรี่ยง ที่แต่งงานแล้วอายุอยู่ในช่วงวัยเจริญพันธุ์ 15-49 ปี จำนวน 2,418 คน ซึ่งอาศัยอยู่บนพื้นที่สูงในจังหวัดกาญจนบุรี โดยมีวัตถุประสงค์เพื่อ 1) ศึกษาแบบแผนและระดับของภาวะเจริญพันธุ์ในแต่ละกลุ่มชาติพันธุ์ 2) เพื่อศึกษาปัจจัยที่เป็นตัวกำหนดภาวะเจริญพันธุ์ในแต่ละกลุ่มชาติพันธุ์ โดยใช้ข้อมูลทุติยภูมิจากโครงการเฝ้าระวังทางประชากรจังหวัดกาญจนบุรีรอบที่ 4 พ.ศ. 2546 ดำเนินการโดยสถาบันวิจัยประชากรและสังคม มหาวิทยาลัยมหิดล

ผลการศึกษาพบว่า สตรีพื้นที่สูง ประกอบด้วย สตรีไทยร้อยละ 60.0 พม่าร้อยละ 7.9 มอญร้อยละ 12.4 และกะเหรี่ยงร้อยละ 19.6 ส่วนใหญ่จะอยู่ในกลุ่มอายุ 30-39 ปี อายุที่แต่งงานครั้งแรกที่มีการรายงานมากที่สุดคือ อายุ 18 ปี โครงสร้างครอบครัวเป็นแบบครอบครัวเดี่ยวมากกว่าครอบครัวขยาย โดยชาวพม่า มอญ กะเหรี่ยง ประมาณ 2 ใน 3ไม่ได้เรียนหนังสือ ส่วนใหญ่ประกอบอาชีพเกษตรกรรม สถานะภาพทางเศรษฐกิจส่วนใหญ่มีฐานะทางเศรษฐกิจต่ำ ขนาดการถือครองที่ดินประมาณ 30 ไร่ เคยใช้การคุมกำเนิดร้อยละ 86.2 และการคุมกำเนิดที่ใช้ครั้งแรก คือ ยาเม็ดคุมกำเนิด แต่ละเชื้อชาติมีแบบแผนของอัตราเจริญพันธุ์รายอายุที่คล้ายคลึงกัน คือสูงสุดในช่วงอายุ 20-24 ปี และลดลงเรื่อยๆ แต่สตรีไทยและพม่าจะมีอัตราเจริญพันธุ์รายอายุที่ลดต่ำลงและสิ้นสุดเร็วกว่าอัตราเจริญพันธุ์รายอายุของงสตรีมอญและกะเหรี่ยง อัตราเจริญพันธุ์ทั่วไปของสตรีพื้นที่สูง เท่ากับ 3.44 โดยสตรีไทยมีค่าต่ำสุดคือ 3.00 รองลงมาคือ มอญ 3.19 พม่า 3.75 และกะเหรี่ยง 4.80 จากการวิเคราะห์โดยใช้สมการถดถอยพหุคูณ (Multiple Regression Analysis) พบว่าปัจจัยที่มีผลต่อภาวะเจริญพันธุ์ของสตรีในพื้นที่สูงจังหวัดกาญจนบุรี พบว่าปัจจัยที่สำคัญ คือ ชาติพันธุ์ อายุของสตรี อายุแรกสมรส จำนวนการตายของบุตรและการเกิดไร้ชีพ ส่วนปัจจัยทางสังคมและเศรษฐกิจมีผลต่อภาวะเจริญพันธุ์สะสมน้อยมาก

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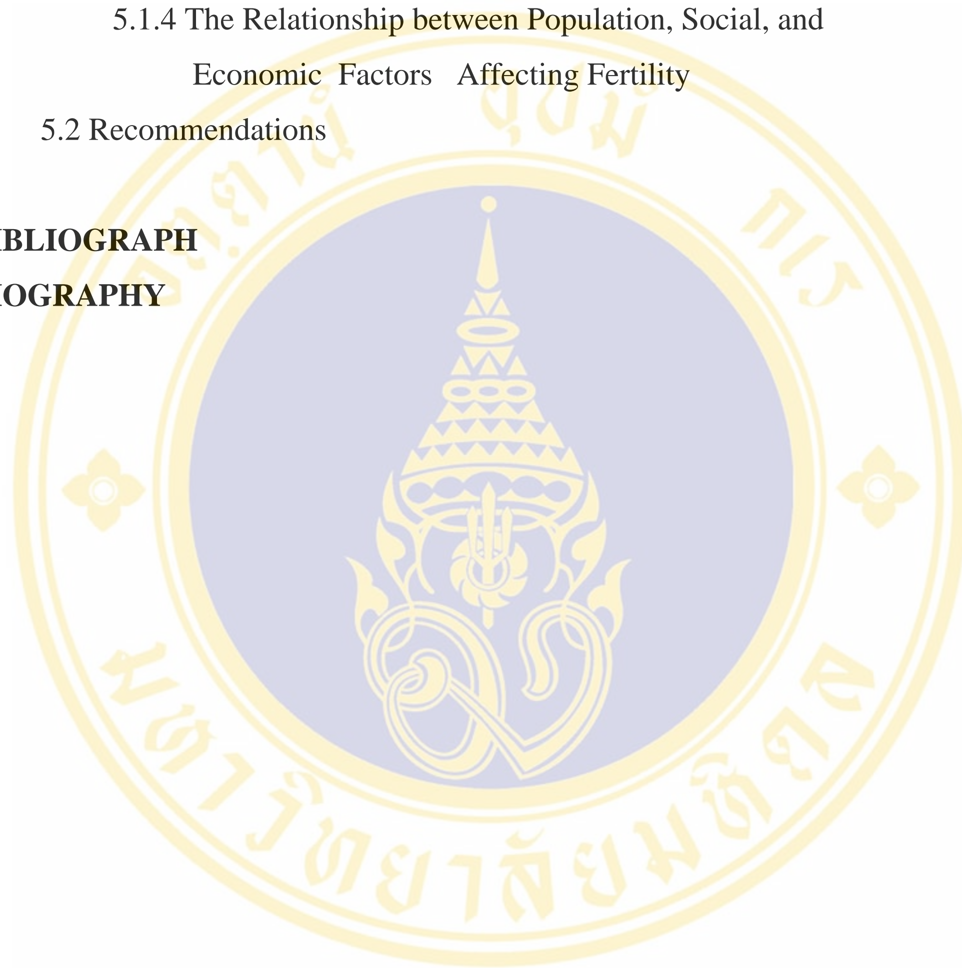

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CHAPTER I
INTRODUCTION

1.1 Background and Significance of the Study

Information from Population and Housing Census in 1970-2000, which is the census conducted every 10 year, indicated that Thailand's total fertility rate was declined from 4.3 to 3.3, 2.4 and 1.9, respectively (National Statistical Office, 2002). Furthermore, an estimation of Institute for Population and Social Research (IPSR) found that in mid-2006 Thailand's general fertility was at the level of 1.7 per woman and it is more likely to decrease to 1.2 or 1.3 per woman in the future (Institute for Population and Social Research, 2006), which is the fertility level below replacement level fertility.

However, when consider each region within the country separately; the level of fertility is still different whereby in 2000 the level of fertility in Thailand was equivalent to 1.9. In the northern region of Thailand, the level of fertility was 1.8; the north-eastern region was 2.1; the central region (excluding Bangkok) was 1.7; and the southern region was 2.2 whereas Bangkok obtained the lowest fertility of 1.1 (National Statistical Office, 2001). When considered fertility in each province in details, the provinces that have the highest fertility are the provinces that have the border close to neighboring countries, including Malaysia, Myanmar, Lao and Cambodia, for examples Prajinburi province, Ubon Ratchathani province, Surin province, Pattani province and Satul province. The population of these provinces is multi-ethnicity.

In Thailand, there are small differences of population regarding ethnicity in which the majority of population in Thailand is Thai, contributing to 90.5 percent, while non-Thai population accounts for 9.5 percent (Institute for Population and

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Social Research, 2004). The majority of non-Thai populations are illegal immigrants as a result of warfare in neighboring countries as well as for job seeking purpose. This group immigrants to Thailand for a long period of time and consists of displaced Burmese, highland population, and Mlabri. Mlabri is a group of people residing in the highland area, consisting of highland tribal groups or minority groups such as Burmese, Chinese and Laotian.

In term of the level of fertility of different ethnic groups in Thailand, it was found that hilltribe people have the fertility level higher than Thai population whereby the fertility of Thai population in the lowland area was equivalent to 2.2; Tai Nua was 2.0; hilltribe people was 4.4; Karen was 4.1 and Hmong was 6.4 (National Statistical Office, 1997). In addition, the study on the fertility level among Burmese migrants showed that Burmese migrants in Ranong province had general fertility equivalent to 3.6, which was higher than general fertility of Thai women (Pimonpan Issarapakdee and Sukanya Jongthavornsathit, 2004).

On the other hand, Kanchanaburi is the province that has its border close to Myanmar and part of its population are hilltribe people and minority groups, particularly Karen and Hmong (Pattama Wapatwong and Pramote Prasartkul, 2004) whereby there is diversity in terms of ethnicity, tradition and culture. In 1999 – 2003, Kanchanaburi province had the level of fertility equivalent to 2.0 (Population and Housing Census, 2000), 2.10, 2.03 and 2.02, respectively (Institute for Population and Social Research, 2004). It has, therefore, come to attention whether high fertility was as a result of the ethnic diversity of the population or not.

1.2 General Characteristics of Kanchanaburi Province

Kanchanaburi is a bordering province situated in the northern and western regions close to the border of Myanmar, consisting of Amphur Sangklaburi, Amphur Tongphapoom and Amphur Saiyok with Tranaosri mountain ranges as the border between the two countries. This border consists of two minority groups, which is Hmong and Karen residing mainly in Myanmar (Pattama Wapatwong and Pramote

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Prasartkul, 2004). According to the report on the 4th basic information survey of Kanchanaburi Project in 2003 by Institute for Population and Social Research, study areas were divided into 5 areas, including urban/semi-urban area, rice field area, crop plantation area, semi-agriculture and highland area, which were categorized by ethnicity of the population within the areas based on language usage in their daily lives as a supportive data for ethnic diversity. Results showed that highland family whose daily communication language was not Thai was as high as 40 percent, which consisted of Karen/Karang/Pakayor language (21.2 percent), Hmong language (9.6 percent), Burmese language (4.8 percent) and other languages such as Laos (4.4 percent).

Topographical characteristics of the province are divided into 3 types: the first type is mountainous/highland area, which is located in the northern and western area of the province and the highest area is in Amphur Sangklaburi with the height above the sea level of approximately 1800 meters; the second type is an upland plateau; and the third type is a central plain. ¾ of the provincial area is the restricted areas that prohibit the population from residing and undertaking any occupational activities since it is Wildlife Sanctuary, ‘pink’ military areas, National Park as well as reserved forest.

The populations of Kanchanaburi province have diversity in terms of ethnicity, language and culture, especially the population residing in highland villages which are situated in mountainous and highland geography and mainly in the restricted areas discussed above. Characteristics of land settlement of the highland population consist of two types. The first type involves governmental division responsible for land allocation by systematically laying out the villages since this group of population is affected by an establishment of the dam. The second type is the population invading into the area for residing and the government gives them permission to reside within that area but without documentation for land tenure. The village lay out was identical to the first type. The major occupation of the population in the highland areas is hired employee and crop farmer.

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In term of the level of fertility in each area, the fertility of urban/semi-urban area is 1.5, rice field area is 1.8, crop plantation area is 2.1, semi-agriculture is 1.5 and highland area is 2.9 (Institute for Population and Social Research, 2004). In the past two years, highland female never had contraception higher than female in any other groups. 44.3 percent of birth rate was from highland female. Moreover, highland female usually get married at an early age and have high pregnancy rate in the beginning of reproductive age. The reason that the fertility level in the highland area is higher than other areas could be as a result of ethnic, cultural and language diversity as previously mentioned.

The study of fertility of highland women, which is multiethnic, is considered highly important because a dramatic increase in population could potentially become an obstacle to economic and social development as well as negatively affect women's reproductive health, especially in the distance areas where it is difficult to gain accessibility to public health services. Therefore, the study of fertility of highland women in Kanchanaburi province is an important issue in studying the level and pattern of fertility of ethnic groups residing in the highland areas as well as factors identifying fertility of these groups.

1.3 Research Objectives

1. To study the pattern and the level of fertility of highland women in different ethnic group.
2. To study factors which identify fertility of highland women.
3. To study factors which identify fertility of each ethnic group.

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CHAPTER II
LITERATURE REVIEW

Fertility is a population phenomenon in relation to social, economic and political condition, tradition and culture in each society. Therefore, the literature review on ethnicity and fertility of women in highland communities in Kanchanaburi province is divided into 3 parts as follows:

2.1 Definition of Highland and Highland Community
2.2 Society, Culture and Fertility of Different Ethnic Groups
2.3 Concepts, Theories and Related Research on Fertility.
Details are as follows.

2.1 Definition of Highland and Highland Community

"**Highland**" refers to the residential area of different hilltribe people and minority groups or the housing and farming location, which is steep approximately more than 35 percent or has height above the sea level above 500 meters, consisting of 20 provinces: Kanchanaburi, Loei, Chiangrai, Chiangmai, Nan, Lampang, Prachuapkhirikhan, Phitsanulok, Uthaithani, Petchabun, Phrae, Suphanburi, Ratchaburi, Kampaengphet, Tak, Lampoon, Sukhothai, Maehongson, Phayao and Phetchaburi (Central Service Office, Department of Provincial Administration, 2000).

"**Highland community**" refers to the community with ethnic diversity, which consists of 10 different hilltribes including Karen, Meo, Yao, Musser, Khamu, Lahu, Lisu, Aka and Mlabri as well as the areas of other minority groups such as Palong, Haw, Burmese, Mon, Laotian, Tai Yai and Thai lowland people who earn a living in the same areas with hilltribe people.

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According to the survey and organization of highland community residence in Thailand in 2002, Hilltribe Welfare Division, Department of Public Welfare conducted a survey and established highland community residence whereby data collection was done in the highland communities of 20 provinces discussed above, which were the main hilltribe communities as well as the areas of other minority groups and the areas where Thai people of the lowland area moved up to reside and earn a living in the hilltribe community or the areas nearby the hilltribe community (Department of Public Welfare, 2003). It was found that there was the total of 3,881 highland villages with the total population of 1,203,149, which consisted of 3,429 hilltribe villages with the total population of 923,527 which was higher than the year 1995 whereby there were 750,000 hilltribe populations (Pornsuk Koetsawang and Krittya Achavanitkul, 1997). Among these numbers, the majority was Karen which accounted for 438,131 people; and minority groups accounted for 210 villages with the population of 67,172; and the villages of Thai lowland people who were residing and earning a living in the highland areas consisted of 847 villages with total population of 212,729.

Kanchanaburi is categorized as one of the provinces with the highland area. The majority of its population or 96 percent are Thai, 3.4 percent are Burmese and 0.6 percent is other nationalities such as Laotian and Chinese (2000 National Population and Housing Census). From the report on basic information of Kanchanaburi Project in 2003, it was found that people residing in the highland area, categorized ethnicity based on language usage in daily lives, consisted of 6 ethnicities as illustrated in Table1.

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Table 1 Population residing in the highland area categorized ethnicity by language usage in daily lives in 2003

Ethnicity	Number
Thai	2,262
Karen/Karang/Pakayor	789
Mon	338
Burmese	179
Laotian	104
Others	48
Total	3,720

Source: Institute for Population and Social Research, 2003

In the study of differences in fertility of female from different ethnicities in the highland of Kanchanaburi province, the focus is placed upon ethnicity of Thai, Karen, Mon and Burmese because these ethnic groups are found the most in the highland of Kanchanaburi province. In this study, ethnicity is categorized by using race as a criterion.

2.2 Society, Culture and Fertility of Different Ethnic Groups

Society and culture relate to fertility of various ethnicities. According to the study of differences in fertility in the United States of America, Goldscheider and Uhlenberg (1969) explained the fertility of assimilationist. Assimilationist is a group of people with social and cultural assimilation, which is the minority group in the US. The hypothesis is that under certain circumstances, for example, when differences in ethnicities were controlled, differences still remained. When the minority group faced with socially disadvantaged problems, they must be compensated by a reduction in child raising responsibility and the compensation would occur when the minority group demanded cultural assimilation and resisted or opposed to family planning. The minority group would then have lower fertility. In other situations, however, fertility might become higher. For example, an opposition to cultural assimilation among the

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minority groups which was extremely nationalistic would lead to high fertility. As can be seen from the study of Roberts and Lee (1970) who analyzed information from population census in 1960 for five different states in the south-western region, it was found that the status of being minority group led to more numbers of children within the family.

On the other hand, the study of differences in fertility in relation to ethnicity in Thailand is not widely undertaken and the study is more often related to difference in religion. For instance, Goldstein (1970) studied differences in fertility by religion, using data from population census in 1960, and found that Muslim women had less children compared to Confucian women and Buddhist women. Confucian women had the number of children slightly higher than Buddhist women. However, the study of fertility by ethnicity in Bangkok showed opposite result whereby Muslim women had the highest number of children, followed by Thai women and Chinese women. Nevertheless, differences decreased when variables relating to difference in residence, education level of wife and husband, women's labor involvement, female income, duration of marriage and current age of female were controlled (Suchart Prasitratthasint et al., 1980).

According to the survey on change in population in 1995 – 1996, it was found that fertility in the southern region was the highest whereby southern women had an average number of children equivalent to 2.8 and had the lowest contraception, which was 60 percent. The southern region of Thailand had a distinctiveness in which the proportion of Muslim population was greater than other regions, especially four bordering provinces situated close to Malaysia including Narathiwat, Yala, Satul and Pattani. The majority spoke Malay or Yawi in their daily lives, except Satul where the majority of its population spoke Thai. Among the population in the southern region, Thai Muslims had higher fertility than Buddhists. From the religious and fertility study in the southern region of Thailand, women were divided into 3 groups: Muslim women who spoke Malay; Muslim women who spoke Thai; and Thai Buddhist women. Results showed that at aged between 15 – 24 years old the average number of children ever born of women in 3 groups was similar because most of the women

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during the aged of 15 – 24 were still single. However, difference occurred at aged 30 and would become more clearly during the age between 30 – 34 years old. Thai women who spoke Malay had the average number of children ever born equivalent to 3.3; Muslim women who spoke Thai had 2.7 children; and Thai Buddhist women had only 1.9 children. According to the analysis of factors affecting attitude toward contraception usage and birth control method, it was found that, in addition to religious factor, language used in daily lives also affected the attitude and birth control method, which was one of the reasons leading to difference in fertility of women in 3 groups (National Statistical Office, 1998).

In addition to the study of difference in fertility of population based on religious difference, there was also a comparison between the groups of population based on different ethnicities. For examples, the study of Ngamlamai Peailueng (2002) compared fertility of Burmese migrant women to Thai women in all age groups and Teankaew Leamsuwan (2003) studied fertility of minority groups in Thailand using data from population and housing census in 2000 and found that hilltribe people had the pattern and the level of fertility higher than the group that spoke Malay or Yawi and the group that spoke Khmer or Kuy language. Similarly, the study on difference in fertility of women in Lao found that women with other ethnicities, especially hilltribe women, had fertility higher than Laotian lowland women (Viphongxai, 2007). High fertility among hilltribe population could be due to cultural and traditional characteristics in which lifestyle of the population of each hilltribe required the high level of self-dependence both in terms of economy that focused on subsistence agriculture and society where hilltribe families usually wanted children for inheritance and parental care.

Furthermore, according to the survey of National Statistical Office in 1997, it was found that fertility in 1985 – 1989 of hilltribe people was equivalent to 5.6; fertility of Tai Nua was 3.7 and fertility of Thai people was 4.9. When considered each tribe of hilltribe population, it was also found that there was difference in each tribe whereby Hmong had the highest fertility of 6.4; Lisu, Aka and Yao was 4.5; and Karen, which accounted for half of total hilltribe population in Thailand, had fertility

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equivalent to 4 persons per woman, which was lower than the study results in the past ten years (1975 – 1979) approximately 1.4 persons. Fertility of Karen was declined to a moderate level when compared to fertility of Thai people during the same period, which declined more than 2 persons (National Statistical Survey, 1997).

Moreover, the study on contraception of hilltribe people in the past also indicated congruent results with fertility whereby hilltribe population had low contraception rate. The contraception rate only accounted for half of Thai population. In 1987, only 39 percent of hilltribe women had contraception while information on change in population in 1995 – 1996 showed that Thai people had higher contraception rate, which accounted for 70 percent (National Statistical Office, 1997). Most of contraception occurred among female more than male and popular birth control method were both temporary and permanent. However, vasectomy was also one method of permanent contraception and was slightly found.

As discussed above, it can be seen that society and culture relate to fertility of various ethnicities, ranging from hilltribe people of each tribal community to Muslims that have distinctive social and cultural characteristics.

2.3 Concepts, Theories and Related Research on Fertility.

2.3.1 Concept in Fertility Analysis

Culture, tradition, social and economic condition of each society is one of the influential factors via intermediate variable and has an effect on fertility. Davis and Blake (1956) divided intermediate variable into 3 groups: 1) Intercourse variable consists of age of marriage, celibacy of women, duration of marriage, voluntary and involuntary sexual abstinence, frequency of sexual intercourse; 2) Conception variable such as contraception, planned pregnancy incapability (female sterilization, vasectomy and medical appliances for conception prevention) and unplanned pregnancy incapability such as long-term postpartum sterility due to breastfeeding; and 3) Gestation variable. Additionally, Freedman (1962) suggested sociological

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concept which is economic, social, cultural and normative variable relating to size of the family greatly have an influence on intermediate variable, which is additional indicator of fertility. Lucus (1980) applied Freedman's concept for further explanation by adding variable relating to social environment, biological characteristics as well as knowledge and attitude toward contraception in relation to fertility.

2.3.2 Pattern and Level of Fertility

Age-Specific Fertility Rate (ASFR): Because birth rate is only a rough rate, which is an average birth rate of the total population and able to indicate only the level of fertility. It is unable to indicate the pattern of fertility. The pattern of fertility can be calculated from age-specific fertility rate by dividing women in reproductive age between 15 – 49 years old into the group, which is usually divided into five-year group. Age-specific fertility rate can be calculated as follows:

$$ASFR\ i = (CEB\ i / P\ i) * k$$

ASFR i refers to fertility rate of age-specific group i
CEB i refers to number of children ever born of age group i
P i refers to women in age group i
k refers to constant value (100 or 1,000)

Total Fertility Rate (TFR): Because age-specific fertility rate indicates fertility of a particular age group in which it contains many values and is also inappropriate for a comparison between the groups of population. Age-specific fertility rate is, therefore, combined into one rate. One of the most popular methods is calculating total fertility rate (TFR), which is a single rate and an index indicating the level and trend of fertility of women throughout their reproductive age. TFR can be calculated as follows:

$$TFR = 5 * \sum (CEB\ i / P\ i) * k$$

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2.3.3 Related Research on Fertility

This research studies the difference in fertility of women from different ethnicities in the highland in Kanchanaburi province. In addition to the study of social and cultural influence of each ethnicity on the fertility level of highland women, the study of related literature found that difference in fertility of each ethnicity also depends on population factors, economic factors and social factors as discussed below.

1) Population Factors

Maternal Age

Generally, maternal age has both positive and negative relationship with fertility, which is measured from the number of children ever born whereby the number of children ever born will increase in accordance with maternal age. For example, Saowanit Ratanawichit (2002) studied fertility of Catholic women in Thailand and found that age and the number of ever born children had a positive relationship. When age increased 1 year, married women would have more children equivalent to 0.1. Moreover, Pimonpan Isarabhakdi and Sukanya Jongthavornsathit (2004) studied fertility of Burmese migrants in Ranong province and found that when age increased 1 year, women would have an increase in the number of children ever born of 0.1, which was consistent to the study of Chai Podhisita et al. (2004) who studied fertility of Karen women and Hmong in the northern region of Thailand and found that when age increased 1 year, Karen women would have an increase in the number of ever born children of 1.1 while Hmong women would have an increase of 1.8.

Age at First Marriage

Age at first marriage has a negative relationship with fertility whereby women who get married at an early age will have higher fertility than women who get married at an older age due to longer duration of pregnancy. For example, the study results of Ngamlamai Peailueng (2002) showed that Burmese migrant women in

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Kanchanaburi province got married earlier than Thai women residing within the same area and had higher total fertility rate than Thai women. Similarly, the study on fertility of Karen hilltribe people in Thailand indicated that Karen women in reproductive age who got married before the aged of 20 would be able to give birth with an average of 2.9 children (Dussadee Paesuwan and Nittaya Saenglek, 2006), which was greater than the fertility rate of Karen hilltribe people in 1996 which was equivalent to 2.6 (National Statistical Office, 1997). The aged between 15 – 19 years old was an early stage of reproductive age. Fecundity which is female's physical ability for pregnancy will be greater than other age groups. As can be seen from fertility of Hutterite population in Canada and the US, which was the population group with high fertility, throughout their reproductive age women would have the average number of children equivalent to 12.4 (Pramote Prasartkul, 2000). This was partly due to an early age of marriage of Hutterite population in which all of them tended to get married before 20 years old. On the other hand, the study in Denmark (United Nations, 1970) indicated that women who got married at aged 15 had the number of children ever born equivalent to 2.5 while those who got married at aged 25 had the average number of children ever born equivalent to 1.8. The study by Pramote Kangsadarn (1982) also found consistent results in which those who got married at aged between 25 – 29 had the number of children ever born equivalent to 4.2 whereas those who got married at aged 30 or above had the number of children ever born equivalent to 3.4.

Marital Status

Marital status (married, widowed, divorced and separated) is an important factor to fertility both directly and indirectly. The study on the level of fertility of Thai women in all marital statuses during 1980 – 1990 indicated that fertility of women who were married and in reproductive age, measured from the number of children ever born, was greater than women with other marital statuses, which were widowed, divorced and separated. This pattern was similar in all age groups. When considered from age standardization rate by using women who used to get married aged 15 -49, it was found that married women had the number of children ever born equivalent to 2.3 while women who used to get married, widowed, divorced and separated had the

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number of children ever born equaled to 2.3, 2.3, 1.7 and 1.7, respectively (National Statistical Office, 1996)

Infant Mortality and Stillbirth

Infant mortality can have an influence on fertility in two characteristics: 1) influence on physical change or biological effect in which infant mortality will extend breastfeeding duration or affect longer period of postpartum sterility. This will in turn affects the longer period of new pregnancy, which can be seen evidently in the society where a mother usually gives breastfeeding to the infant and; 2) effect on maternal behavioral change in which the family with high infant mortality will also have high fertility in order to compensate their loss. According to the study of the mothers and their partners in Egypt, Turkey, India, Pakistan, Taiwan, Korea and Guatemala, it was found that women who experienced infant mortality usually had higher fertility than women who had never experienced infant mortality (Thawatchai Worapongsathorn et al., 1984), which was consistent to the study by Kua Wongboonsin (1979) using socio-economic data of the population in fishery villages. Results indicated that village women who experienced 3-4 infant mortalities would have the number of children ever born equivalent to approximately 9.4 and women who experienced 1-2 infant mortalities would have the number of children ever born of 6.5 whereby the number of children ever born was greater than those who had never experienced infant mortality and had the average number of children ever born o 3.9. On the other hand, Teankaew Leamsuwan (2003) studied fertility of minority group in Thailand using data from population and housing census in 2000 and found that change in infant mortality had a relationship with change in fertility of this population group. Kua Wongboonsin and Weerasit Sitthitrai (1981) stated that experience in infant mortality had an influence on the desire to have children of the mother whereby the mother would need more children. In addition, infant mortality experience of neighborhoods could also have an influence on this. From the above research, it can be seen that the number of infant mortality and stillbirth has a positive relationship with fertility whereby infant mortality or stillbirth is a crucial factor influencing their partners to have more number of children in order to compensate their loss.

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Information regarding infant mortality from the survey on pregnancy, birth and infants in Kanchanaburi Project in 2003 within two-year duration prior to the survey indicated that the mother had the number of children ever born contributed to 0.6 percent and stillbirth accounted for 0.2 percent (Panee Wong-ek et al., 2006). Furthermore, the study on the completion of death registration in Thailand: a case study of 1st Kanchanaburi Project in 2000 – 4th Kanchanaburi Project in 2003 (Pattama Wapatthanawong and Pramote Prasartkul, 2004) demonstrated that the lack of death registration completion was found the most in the age group below 5 years or 20.8 percent, which was higher than other age groups. Mostly, the lack of death registration completion in the age group below 5 years did not include the death of the children aged below 1 year and the infants because the number was minimal. In addition, villagers did not perceive the need to report the early death of children and infants because the children and the infants did not involve any legacies unlike the death registration of adults which involved various benefits such as money, insurance, cremation money, and heritage management (Aree Prommo and Phillip Guest, 1996).

Contraception

Contraception is one of the factors that directly affect a decrease or an increase in fertility. In Thailand, contraception is the major factor causing a reduction in fertility (Phillip Guest, 1994). It was found that when the population policy was initiated by family planning in 1970, contraceptive prevalence rate or CPR in married women aged 15 – 44 years increased from approximately 15 percent in 1970 to 53 percent in 1978, to 64 percent in 1984, and to about 71 percent in 1987.

Hilltribe people with high fertility had low CPR and hilltribe people with low fertility had high fertility. Moreover, hilltribe people had CPR which accounted for 39 percent (National Statistical Office, 1986). On the other hand, data obtained from the survey on change in population in 1995 – 1996 showed that Thai people had CPR equivalent to 70 percent (National Statistical Office, 1997). The birth control method was also different among Thai population, Tai Nua, and hilltribe people. The most popular method for Thai people and Tai Nua was contraceptive pill, tubal sterilization and contraceptive injection, respectively. As for hilltribe people,

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contraceptive pill was also popular. Rossarin Sottipong (1991) studied about Karen group and found that contraceptive implants was popular among Karen people according to the advice given by public health officers of Karen village and Karen women who had never received any advice on family planning would have less contraception compared to Karen women who had previously received the advice on family planning, resulting in higher fertility among Karen women. On the other hand, the study results of Ngamlamai Peailueng (2002) indicated that Burmese migrant women had overall CPR lower than Thai women and had age-specific fertility rate and total fertility rate higher than Thai women.

2) Social Factors

Education Level

Education level is an important variable of various changes in terms of population, economy and society. Education is an enhancement of knowledge and skills and changes attitudes toward women from undertaking housewife duties and looking after their children. Educated women have more opportunity for working outside their home and have more responsibility toward the jobs, resulting in postponement of the age of marriage.

The study on relationship between education and fertility in the past showed that education had a relationship with the number of children ever born (Saowanit Ratanawichit, 2002) in which fertility would be high among uneducated mothers and continued decreasing among educated mothers who obtained high school and university education level (Cochrane, 1978; Tienchai Keeranun, 1981). Moreover, fertility also had an indirect effect via birth control method. The research findings of Supaporn Teerajun (1988) indicated that highly educated women were more likely to have higher contraceptive pill usage because highly educated women tended to be more modernized and accept new innovation or using contraception method easier than women with lower education level because they were able to understand the problems better women with lower education level. This affected a reduction in fertility in which the higher education level of the mother would result in

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less number of children because highly educated women would choose to raise their children to meet the highest standard in order to become better children in the future rather than having many children (Boonkong Hanjangsit, 2000).

From the research findings discussed above, education level of the mother has a negative relationship with fertility. The higher education level will result in the less number of ever born children since education is the social factor affecting intermediate variable, which results in fertility including sexual intercourse, conception and pregnancy.

Work Status

Work status refers to women's participation in the labor market, which is a social factor influencing fertility. The study affirmed that working women who receive wages will have fewer children than women who do not work or work at home without being paid. Stycos and Robert (1967) studied "*Role Compatibility between Working and Being the Mother of Women*". It was found that if the role of mother and working were congruent, the relationship between working and having children would also become greater. For example, working in the farm or small family business, the role of working and being the mother was not contradicted because work characteristics did not require consistent responsibility and such works could be undertaken within or nearby the house without being paid. However, if the role of being the mother and working was contradicted, the relationship between working and having children would occur, but the relationship level would depend on the effectiveness of pregnancy prevention in each society. There are a number of studies supporting this concept. For example, the study by Jintana Petcharanont and Apichart Jumrasritthiwong (1980) showed that women who were working in the family business without being paid were more likely to have higher fertility compared to other occupations. It can be said that work status of women in relation to participation in the labor market would have an effect on fertility whereby working was contradicted to the role of those women as the mother who needed to raise their children. Working women tended to have fewer children because they did not have sufficient time in looking after their children or if they wanted to have many children,

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they would need to spend most of their working time to look after their children, which was an opportunity cost between working and having children. Therefore, working and the number of children had a negative relationship, which was consistent to the study of Pimolwan Issarapakdee and Sukanya Jongthavornsathit (2004) found that Burmese migrant women in Ranong province who were working would have less children compared to migrant women who did not work. In contrast, the study conducted by National Statistical Office (n.d.) showed that working women had the number of children ever born of approximately 2.3, which was higher than women who did not work and had the number of children ever born of 2.2.

Occupation

Occupation is the social factor that has an influence on fertility whereby agricultural women or housewives will have higher fertility than women who do not work in agricultural field (Institute for Population and Social Research, 2002). Moreover, those who are farmers tend to have greater number of children ever born than those working in other occupational areas (National Statistical Office, n.d.) This is possibly because women who do work in agricultural field, characteristics of work often contradict to the mother role, that is working outside their home resulting in the lack of time to look after their children and, therefore, have fewer number of children. In the study conducted by Prapai Srichai and Chuenchom Petchor (1981) on women's occupation in providing family planning service for postpartum patients at Siriraj Hospital, it was found that government officials accepted contraception the most, followed by farmers, mongers and hired employees, respectively. Kuea Wongboonsin and Weerasit Sitthitrai (1981) studied "*Economic and Social Factors Affecting Fertility of Thai Women in Rural Areas: A Comparison between Crop Farmers and Fishermen*" and found that type of occupation in fishermen society had a relationship with the average number of children ever born in a clear pattern in which people working as management, technician, government officials and clerk had the average number of children ever born of 3.3; people who were mongers had the number of ever born children of 4.2; people who worked as master craftsman and hired employees have the number of children ever born of 4.34; and people who worked in agricultural and fishery field had the number of children ever born of 4.7.

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However, such relationship with crop farmers was in contrast whereby hired employees had more children than those office workers.

Family Structure and Family Relationship

Family structure that is nuclear family and extended family has an influence on different fertility level. The study undertaken by Malinee Chaumpruk (1973) found that fertility of extended family in an urban area tended to be higher than nuclear family. Other research indicated that in Thai society nowadays extended family seemed to have higher fertility comparing to nuclear family because there was less decision-making authority of wife and husband in extended family comparing to nuclear family. The decision-making authority to have children, to manage or to decide on various issues relating to partner selection, work, occupation and child raising as well as to provide social knowledge and experience to children would largely depend on elderly within the family. Generally, there was no conversation or decision-making relating to having children between wife and husband. Better communication between wife and husband would affect contraception in order to limit the number of children (Barkat-e-Khuda et al., 2002). Children come from the process of pregnancy which is acceptable and unavoidable as a life process rather than decision-making process. For example, the study on Hmong hilltribe people in Chiangrai province by Satien Chanta (2001) indicated that in extended family, living with their parents, parents had an influence on identifying sexual needs of their children and the number of children. Moreover, the study conducted by Apaporn Maysamarn (1992) on the topic "*Contraception Instruction to Hmong Population*" found that knowledge transfer via male elderly was proved effective at some levels in term of contraception, which was consistent to the research findings of Somkuan Jaikrajang (1997). Results showed that husband took part in planning for the number of children and displayed their attitude toward contraception that it should be female responsibility, indicating that the decision to have children was not only left to women, but also other family members.

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3) Economic Factors

Economic Status

Economic status is a crucial factor that has an influence on fertility because economic status has a relationship with a standard of living and represents preference of the family. Large amount of property owned usually has a relationship with the higher standard of living and expenditure per child within the family is also high accordingly. As a result, the family with better economic status prefers having quality children and the desire to have children will then decrease.

The research findings of Suntaree Suwipakij (1979), which applied monthly family income as an indicator of economic status by dividing income into 2 groups, including family with income below 2,999 Baht and family with income above 3,000 Baht, indicated that income and fertility had a negative relationship in which the family with income below 2,999 Baht had the average number of children ever born equivalent to 3.2 whereas the family with income above 3,000 Baht had the average number of children ever born of approximately 2.7. The study of Prasit Rittinetikul (1988) also showed the same results in which family income had a negative relationship with ideal parity because in agricultural society where income derived from agricultural productivity being sold. Labor was an important production factor in increasing productivity to the family. Therefore, the family had the desire to have children as the labor in increasing productivity to the family.

In contrast, previous research applied wealth as an indicator of economic status. For example, Benjawan Tongsiri (1987) studied fertility of hilltribe people in Maehongson province and found that economic factors had an influence on fertility of hilltribe people to be at a high level whereby the average number of children ever born was equivalent to 5 children per family, which was consistent to National Statistical Office (n.d.). The findings showed that marriage couples that had high economic status were more likely to have the desire to have children more than marriage couples that had lower economic status. Socbandi (1977) studied economic and social factors affecting size of the family in Indonesia by interviewing married

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women aged 20-24 and found that poor economic status women, middle economic status women, and high economic status women had the desire to have ideal children equivalent to 3.5, 3.8 and 4.3, respectively (cited in Prasit Ritthinetikul, 1988), which was congruent with Rossarin Soottipong (1995) who found that economic status had a positive relationship with fertility of Karen people in the northern region of Thailand. Karen people with higher economic status tended to have more children than Karen people from other groups because poverty and malnutrition problem affected Karen women to have menopause earlier, the duration of having children would then become shorter than the group with higher economic status.

Size of Land Ownership

Size of land ownership is considered greatly important for highland population due to geographical constraint which is the mountain hill and plateau appropriate for agriculture. Therefore, highland people will require labor to increase productivity of the family. According to all of the previous studies of both hilltribe people and Thai lowland people, size of land ownership and parity had a positive relation whereby Karen population in Chiangmai province had large size of land ownership and did not widely use contraception as they wanted to have children for helping them to work (Rossarin Soottipong, 1991), which was consistent to Supreeya Suthunmanuwat (1982) who studied about Thai lowland population and found that size of land ownership was very important in agricultural areas. The family that had large size of land ownership usually required a large number of labors for paddy farming. Therefore, these people had a lifetime security for self-support on their own land as well as had landed property as a heritage for their children. The mother usually helped to do paddy farming on her own paddy field, which did not contradict to child raising responsibility. As a result, the family with large size of land ownership tended to have more children for labor benefits in the future and the time value was that there was no opportunity cost between working and child rearing. In contrast, when consider size of land ownership and ideal family size the relationship was opposite. Chavalit Siripirom (1982) studied about fertility and influence of wives working outside their home on decision-making relating to family pattern by interviewing married women who stayed with their husband, and found that women in

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the family that lacked of land ownership had the desire to have children at an average of 3.4; and women in the family with land ownership of 1-5 *Rai* and 6 *Rai* and above had the desire to have children at an average of 3.3 and 2.8 children, respectively. It can be said that land and children is a security or hope for parents when they become older. When one thing is obtained, another has become unnecessary. For example, those who had large size of land ownership did not need to have many children as they had already obtained a security for the stability of their lives. In contrast, those who did not have a security tended to have more children as they hoped to rely on their children when they becaome older (Mead Cain, 1983 cited in Prasit Ritthinetikul, 1988). This study expects the size of land ownership to have a same-way relationship with the number of children ever born according to the above reasons.

2.4 Conceptual Framework

This research studies factors affecting fertility, which are measured by the number of children ever born of highland women. Based on the review of literature and related research, the decision to have children of married couples has an influence on fertility. In addition to difference in ethnicity and tradition, population factors, social factors and economic factors also identify fertility. Variable used for analysis include age, ethnicity, marital status, education level, occupation, work status, family structure/family relationship, economic status and size of land ownership. Intermediate variables of fertility consist of age at first marriage, contraception, infant mortality and stillbirth as control variable. It can be summarized into the following figure.

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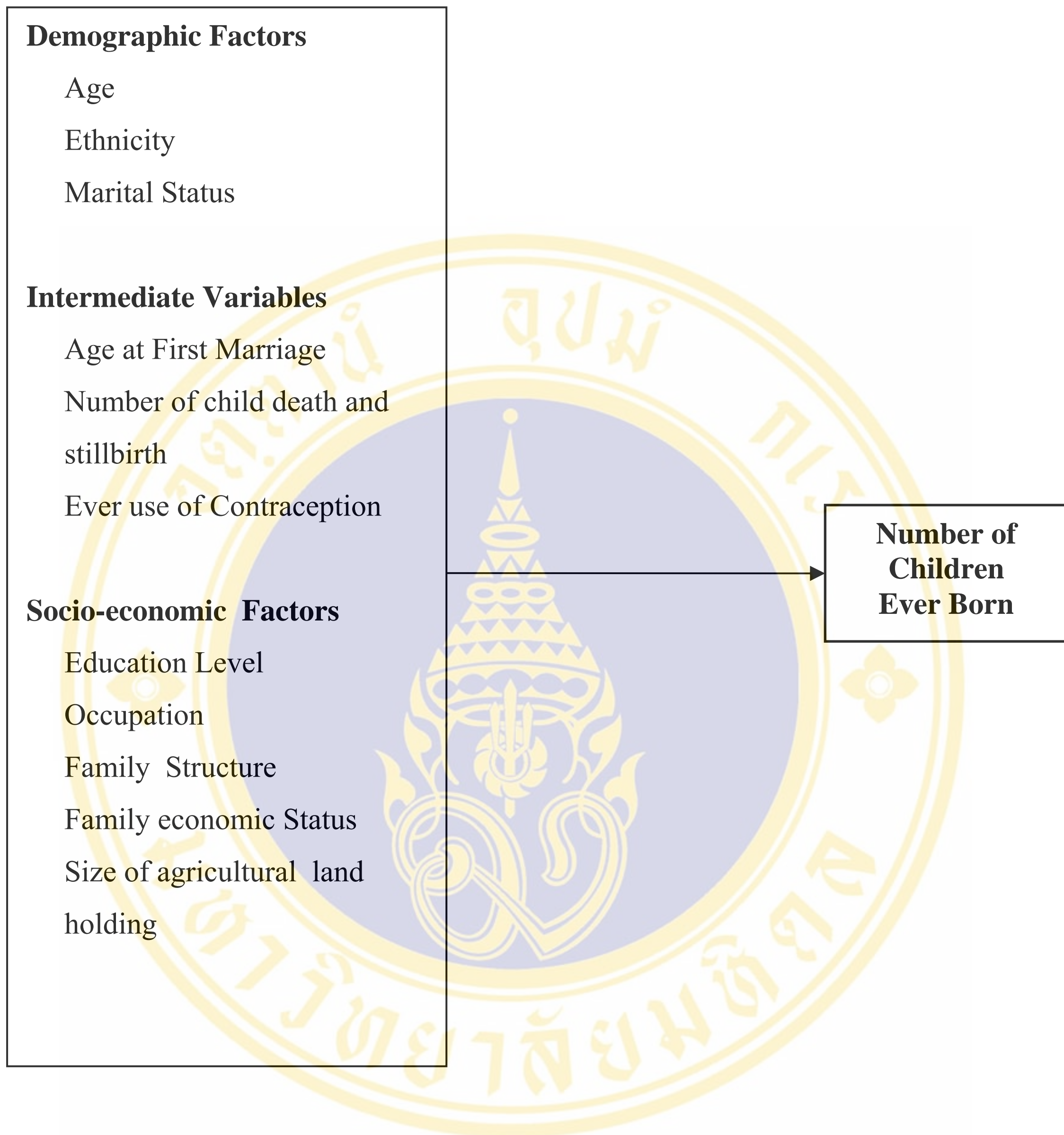

Figure 2.1 Conceptual Framework of Factors Identifying Fertility of Highland Women

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CHAPTER III
METHODOLOGY

3.1 Study Area

The Kanchanaburi province is located in the western part of Thailand, bordering with Myanmar. It is the third largest of Thailand's 76 provinces, covering an area of 19,480 square kilometres. The administrative centre of the province is 130 kilometres west of Bangkok and has 13 administrative districts called *amphoes*. It is an important producer of plantation crops and one of the major tourist destinations in Thailand. According to 2000 Population and Housing Census, there are 734,480 people in the province (NSO, 2003). It has one of the six official immigration checkpoints along the Thai-Myanmar border with an additional of numerous illegal routes. The province hosts numerous migrants of Myanmar origin, both legal and illegal nature with various ethnic affiliations. According to Oppenheimer et al. (1998), it houses largest Karen population in Thailand.

3.2 Research Design

The study is a cross sectional study, using secondary data from the Kanchanaburi Demographic Surveillance System (KDSS), implemented by the Institute for Population and Social Research, Mahidol University, Thailand. It was designed to record changes in demographic, social, economic and health status of population in the study area on an annual basis from the year 2000 to 2004. The uniqueness of the data lies in the fact that it is arranged on a sectoral basis reflected through five strata. These strata are: 1) urban/semi-urban (industrialized), 2) rice producing, 3) plantations, 4) uplands areas, and 5) mixed economy. Each of these strata has its own unique characteristics. The data collection method used to collect data for the

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Kanchanaburi DSS is a census. Totally 100 villages/census blocks were surveyed for every round.

Data used for this study is from round 4 (2003). This is because in this round, ethnicity of respondents was asked. Data for this round was collected between 1st July and 27th August of 2003. For the current study, only surveyed population living in upland areas stratum of Kanchanaburi province were considered. The samples were from 25 villages from the four districts (amphoe) of Sangklaburi, Tongphaphume, Saiyok, and Srisawat. These four districts are designated as "the restricted areas for displaced persons (The Registration Administration Bureau, 1999).

There are three types of questionnaire used in the Kanchanaburi DSS for every round. However, in the present study, only household and individual questionnaires were used. The Individual Questionnaire is divided into five parts. Some of its main constituents were individual information, occupation, income, marriage, migration, fertility, contraceptive use, health behaviour, aging, etc. This questionnaire was administered to respondents aged 15 years or above.

Based on the objectives of the study, all women of reproductive age (15-49) who were enumerated for this round of KDSS were selected to analyze level and pattern of fertility. The total number of women for fertility was 2,741 persons. Retrospective data on childbearing were taken from the contraceptive use calendar attached to individual questionnaire. The calendar contains monthly contraceptive history for the previous 24 month of all married women who had ever used contraception. For each month, respondent were required to indicate their maternity status (whether they were pregnant or gave birth or terminated a pregnancy) or contraceptive use status whether they were using or not using. If they used contraceptives, the type of contraceptive was specified. For the analysis of determinants of fertility, only 2,418 ever married women of reproductive age were selected. Individual characteristics such as socio-economic and demographic data were also employed to analyze factors affecting fertility.

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3.3 Measurements of Fertility used in this study

3.3.1 Age specific fertility rate (ASFR)

Age specific fertility rate is used to illustrate pattern of fertility of women in reproductive age in this study. It was calculated as the number of births in a year to mothers of a specific age per woman (or per 1000 women). ASFR in this study is calculated for women in each 5-year age group within the childbearing ages. The number of children ever born during July 2002 to August 2003 is used for the calculation of ASFR.

Populations all over the world manifest the same age-specific fertility pattern. Rates start from zero at very young ages, rising to a peak sometime in the twenties, then declining gradually until again reaching zero, depending on differences in age at marriage, on the proportion of women sexually active or on the desire and possibility of controlling pregnancies.

3.3.2 Total Fertility Rate (TFR)

For the analysis of level of fertility, Total Fertility Rate (TFR) is employed. It is defined as the sum of the age-specific fertility rates for a single year of age over the childbearing span. The computation is done on a “per woman” basis. It represents the average number of children a group of woman, assuming that none of the women die before reaching the end of the childbearing period (age 15-49) and conforming to the fertility rates of women in each age group in a given year. TFR is a good summary index of fertility behavior of women of a birth cohort or in a calendar year. Reasons are that TFR will indicate the fertility level of a population that can be rapidly compared from one population to another, because TFR is a summary measure independent of the age and sex composition of a population. Its interpretation is also simple and straightforward.

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Cumulating the age-specific fertility rates (per woman) for all ages of women derives the TFR. When rates are calculated for the seven conventional 5-year age groups, the TFR is the sum of the rates for each age group, multiplied by five (the width of the age-group interval).

3.4 Variables

3.4.1 Independent variables:

3.4.1.1 Demographic factors

Demographic variables used in this study are divided into 2 categories: demographic characteristics and intermediate variables of fertility.

Demographic characteristics

Age: Age is a women's age in completed year at the time of.

Ethnicity: Due to Kanchanaburi province shares a long border with Myanmar, hence there are variety of ethnic groups of migrants from Myanmar migrated to this province. Therefore, population residing in the highland area include not only Thais but also Burmese, Mon, and Karen. In this study, ethnicity of respondents is divided into 4 categories, namely Thai, Burmese, Mon and Karen.

Marital status: Information on marital status in the survey is categorizes as single (never married); currently married; widowed (not remarried); divorced (not remarried); separated and ever married (but doesn't know status now).

Family structure: The family was identified as extended if there were three generations of family members living in the same household, whereas, the family will be classified as nuclear family if the family consisted of only one to two generations.

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Intermediate variables for fertility

Age at first marriage: Age at first marriage refers to age at which women enter their first union, legal or otherwise, with a member of the opposite sex. In this study, age at first marriage is assessed by self-reported age of first union.

Ever use of contraceptive: Contraceptive use refers to whether the respondents ever used any contraceptive method during her lifetime. It is a self-report by ever married women aged 15-49.

Number of child death and still birth: Number of child deaths refers to number of children of ever married women that died before aged 5 years. For still birth, it was defined as late foetal death that occurred after twenty-eight week of gestation.

3.4.1.2 Socio-economic factors

Education: Level of women's education refers to the highest level of education women complete at the time of the survey. Most immigrants from Myanmar have not attended school in Myanmar and have no permission to attend school in Thailand. However, there are some immigrants who report of schooling in their home country. This variable was grouped as follows: no schooling, compulsory school, higher than compulsory school.

Occupation: Kanchanaburi province is one of an important producer of plantation crops in Thailand. Hence agriculture is a major occupation in this province. According to the Kanchanaburi DSS during 2000-2004, more than forty percent of female are in agricultural sector. Hence occupation in this study was indicated by dummy variables for working in agricultural and non-agricultural sector.

Size of agricultural land holdings: Land holdings refers to whether the respondent has, or does not have, access to agricultural land at the time of the interview. The land holding in this study does not take legal property into

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consideration. It refers to size of agricultural land that respondents have access to. It is measured in square Waa.

Family economic status: This is a composite index, calculated from number of household assets. The respondents were asked whether they owned any material goods in the household. The item will be scored one if it is owned by the family and scored 0 if they did not own it. Then, the number of material goods owned by the family is summed up and become scored of household assets. The family economic status is therefore grouped into 3 groups of high, medium, and low wealth by using percentile at 33 and 66.

3.4.2. Dependent Variable (Fertility variable)

Children ever born*:* Children ever born reported by ever-married women at reproductive age (15-49). Children ever born is measured from aggregating number of children born alive of women's life-time experience. The number of live births in the past year is used to calculate age specific fertility rates and the total fertility rate. These are used to describe the fertility pattern and level.

3.5 Methods of data analysis:

Women characteristics and their fertility behavior are described as follows:

3.5.1 For the analysis of fertility level and pattern, the estimated of age specific fertility rate (ASFR) is calculated by five-year age group and the sum up of these numbers is defined as the total fertility rate (TFR). The fertility level and its pattern are presented by ethnic group.

3.5.2 The univariate analysis includes frequency distribution of the respondents by their background characteristics, such as current age, ethnicity, age at first marriage, education, occupation, land holding, and economic status of their family, as well as number of live births.

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3.5.3 One of the research objectives is aimed to investigate factors that effect cumulative fertility of women in high land area of KDSS. Therefore, multivariate analysis, using Multiple linear regression models is performed.

Table 3.1 Summary of variables and measurement

Variable	Description	Measurement
Dependent Variables:		
Children ever born	The numbers of all children that born alive to women, it is including the living children, children that live else where while data collecting and the death children.	Interval
Independent Variables:		
Education Level	No education = Ref. category Primary = 1 & other =0 Secondary/upper secondary =1& other =0	Ordinal
Marital status	Currently married = Ref. category Widow/Divorced = 1 & other = 0	nominal
Age of women	Current age in years of women at the time of data collection	Interval
Ethnicity	Thai = Ref. category Burmese = 1 & others = 0 Mon = 1 & others = 0 Karen = 1 & others = 0	Nominal
Family structure	Nuclear Family = Ref. category Extended Family = 1	Nominal
Occupation	Agricultural = Ref. category Non agricultural = 1	Nominal

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Variable	Description	Measurement
Age at first marriage	age at which women enter their first union, legal or otherwise,	Interval
Ever use of contraceptive	Ever contraceptive = Ref. category Never contraceptive = 1	Nominal
Family economic status	Low = Ref. category Middle = 1 & others = 0 High = 1 & others = 0	Ordinal
Number of child deaths and still births	number of children of ever married women that died before aged 5 years	Interval
Size of agricultural land holdings	Referring to the agricultural land that the family own or is operating. (Number in square waa)	Interval

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CHAPTER IV
RESULT AND DISCUSSION

The total of 2,741 women in reproductive age in upland stratum to Kanchanaburi Demographic Surveillance System (KDSS) in 2003.Were included in the study the ot differences of fertility of women from different ethnic groups in highland in Kanchanaburi province. In the study of factors affecting cumulative fertility, the sampling size of 2,418 ever married women, who were in reproductive age of 15-49 years old and married, were selected. This chapter will present data relating to population, socio and economic status of married women as well as the relationships between there variables and fertility. Results of data analysis are illustrated in two sections as follows

Section 1: Patterns and level General fertility of Highland Women

Section 2: Characteristics and factors affecting fertility highland married women are divided as follows

2.1 Population, social and economic characteristics and fertility behavior of highland married women.

2.2 Analysis of factors affecting fertility of highland women and factors affecting fertility of different ethnic groups.

4.1 Pattern and Level of General Fertility of Highland Women

The situation relating to fertility can be explained from the pattern and the level of fertility whereby age-specific fertility rate (ASFR) will explain the pattern of fertility, which is calculated from the number of ever born children in that age group in one year divided by the total number of women in that age group, and total fertility rate (TFR) explains the level and the trend of fertility. Change in the pattern of fertility will have an effect on the level and the trend of fertility. In this research, age-specific

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fertility rate is the fertility rate calculated from data within one-year range, which is from August, 2002 to July, 2003.

When consider age-specific fertility rate (ASFR) of highland women, ASFR of the age group between 20 – 24 years old is the highest, which is equivalent to 0.26.

There is no birth occurred among the age group of 45-49 and it is slightly found in the age group of 40-44, equivalent to only 0.02. The pattern of fertility of highland women is similar to the pattern of fertility of general women, which is a downward J shape whereby at the beginning of reproductive age, ASFR will become higher and then gradually decline until ASFR is equivalent to 0. As illustrated in Figure 4.1, total fertility rate (TFR) of highland women is 3.44, meaning that highland women have the average number of ever born children equivalent to 3.44 throughout their reproductive age. When compare with TFR of Thailand, it is found that TFR of highland women is twice higher than TFR of Thailand, which is 1.7 (Institute for Population and Social Research, 2006).

4.1.1 The Pattern of Fertility of Thai Women

The pattern of ASFR of Thai women in the highland areas is similar to the pattern of ASFR of highland women in which the age group of 20-24 accounts for 0.22 and it is more likely to decline to 0. At the end of reproductive age, the pattern of fertility of highland women and Thai women tends to continuously decrease. This is probably because these women groups get married at an early age and have family planning in order to identify the number of children they want to have and are ready to have children after they get married. When they have enough children, they will use birth control method in order to discontinue pregnancy. It is found that the age group of 15 – 19 currently uses contraception at the very low rate of 3.1 percent and contraception usage will increase according to age. TFR of highland Thai women is equivalent to 3.0, meaning that highland Thai women have the average number of children equivalent to 3 throughout their reproductive age.

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4.1.2 The Pattern of Fertility of Burmese Women

According to ASFR of Burmese women in the highland areas, it is found that ASFR will be low during the first period, which is the age group of 15-19 whereby ASFR is equivalent to 0.07. It will increase and then decrease accordingly: age group of 20-24 (0.27); age group of 25-29 (0.22); age group of 30-34 (0.09); and age group of 35-39 (0.10), respectively. It can be seen that current fertility of Burmese women will end at aged 39 whereby there is no child born prior to the end of reproductive age. This is probably because the sampling group in this survey found Burmese women aged between 40 – 49 years old at only a small percentage of 2.1 percent; therefore, there is no obvious difference of current fertility. TFR of highland Burmese women is equivalent to 3.75, meaning that highland Burmese women will have the average of 3.75 children throughout reproductive age, which is less than TFR of Burmese migrant women who are married in Ranong province, which is equivalent to 4.88 (Pimonpan Isarabhakdi and Sukanya Jongthavornsathit, 2004).

4.1.3 The Pattern of Fertility of Mon Women

In term of ASFR of Mon women, ASFR of the age group of 15-19 is still low, which is only 0.02, while the highest ASFR is in the age group of 20-24 and 25-29, which is equivalent to 0.21. Then, it will decline and rise again in the age group of 35-39, which is 0.11. Finally, the fertility rate will decrease to 0 whereby there is no childbirth in the age group of 45-49. TFR of Mon women is 3.19, meaning that Mon women have the average number of 3.19 children throughout their reproductive age.

4.1.4 The Pattern of Fertility of Karen Women

According to ASFR of Karen women, ASFR is quite high in the beginning of reproductive age in which the age group of 15-19 accounts for 0.13 and the highest is in the age group of 20-24 equivalents to 0.37, and it will rapidly decline in the age group of 25-29, which is 0.16. Then, it will gradually decrease when age increases

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until the fertility rate equals to 0 at aged 45-49. TFR of Karen women is 4.80, meaning that Karen women have the average number of 4.80 children throughout their reproductive age, which is very high when compare to fertility of Karen hill tribe people in 1996, which is 2.6 (National Statistical Office, 1997) and 2.9 in 2005 (Dussadee Paesuwan and Nittiya Saenglek, 2005).

When compare the pattern of ASFR in each ethnicity of minority groups, there is the similar pattern in which Burmese women, Mon women, and Karen women in the first age group of reproductive age between 15 – 19 years old will have low fertility rate whereas the highest fertility rate is in the following age group of 20-24. In such age group, Karen women have the highest ASFR, and the fertility rate will then gradually decline to 0. Before the fertility rate reaches 0, it is found that in each ethnicity the fertility rate will increase again in the age group of 35-39 as a result of having the second or the third children of those women. More interestingly, the fertility of Burmese women will end prior to the last age of reproductive age, meaning that Burmese women who are aged above 40 will stop having children. The patterns of fertility of women from four ethnic groups are clearly similar whereby in the late reproductive age of 45 – 49 years old, women from all four ethnicities will stop having children.

As for TFR, TFR of highland women is equivalent to 3.44. It is found that Karen women have the highest average number of children, which is 4.80, followed by Burmese and Mon women (3.75 and 3.19, respectively). When compare Thai women with minority groups of Karen, Burmese and Mon, it is found that TFR of Thai women accounts for the lowest rate of 3.0. The reason that Karen women have the most children comparing to other ethnicities throughout their reproductive is due to early mentioned reasons, including having children among Karen women does not contradict to working because Karen society is agricultural society where people work on their own farmland; therefore, they are able to take children with them. Moreover, the family characteristic of Karen is extended family in which there are relatives helping them look after their children. Karen women perceive that having a lot of

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children will help them obtain more future labor for farming and it is also their life assurance once they are old.

According to the above results, the differences in ethnicities affect the pattern and the level of fertility to be different (Figure 4.1-4.2).

Table 4.1 Age Specific Fertility Rate (ASFR) and Total Fertility Rate (TFR) of women in highland area of Kanchanaburi during July 2002 to August 2003

Age group	Age Specific Fertility Rate-ASFR				
	Thai	**Burmese**	**Mon**	**Karen**	**Total**
15-19	0.11	0.07	0.02	0.13	0.09
20-24	0.22	0.27	0.21	0.37	0.26
25-29	0.13	0.22	0.21	0.16	0.15
30-34	0.09	0.09	0.06	0.10	0.09
35-39	0.04	0.10	0.11	0.12	0.07
40-44	0.01	0.00	0.03	0.08	0.02
45-49	0.00	0.00	0.00	0.00	0.00
TFR	**3.00**	**3.75**	**3.19**	**4.80**	**3.44**

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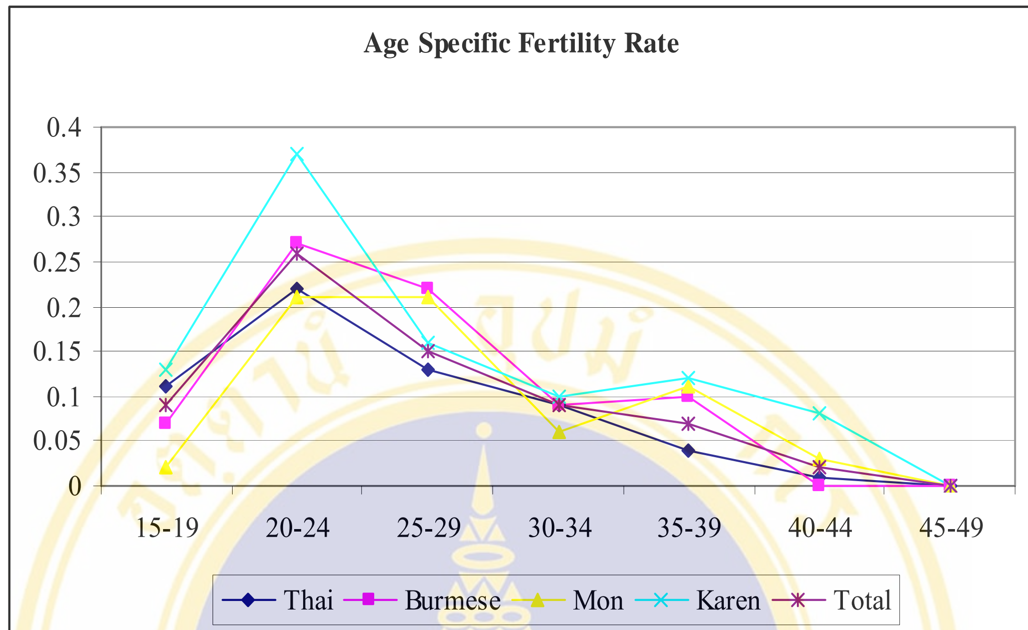

Figure 4.1 Age Specific Fertility Rate of women in highland area of KDSS during July 2002 to August 2003 by ethnic group

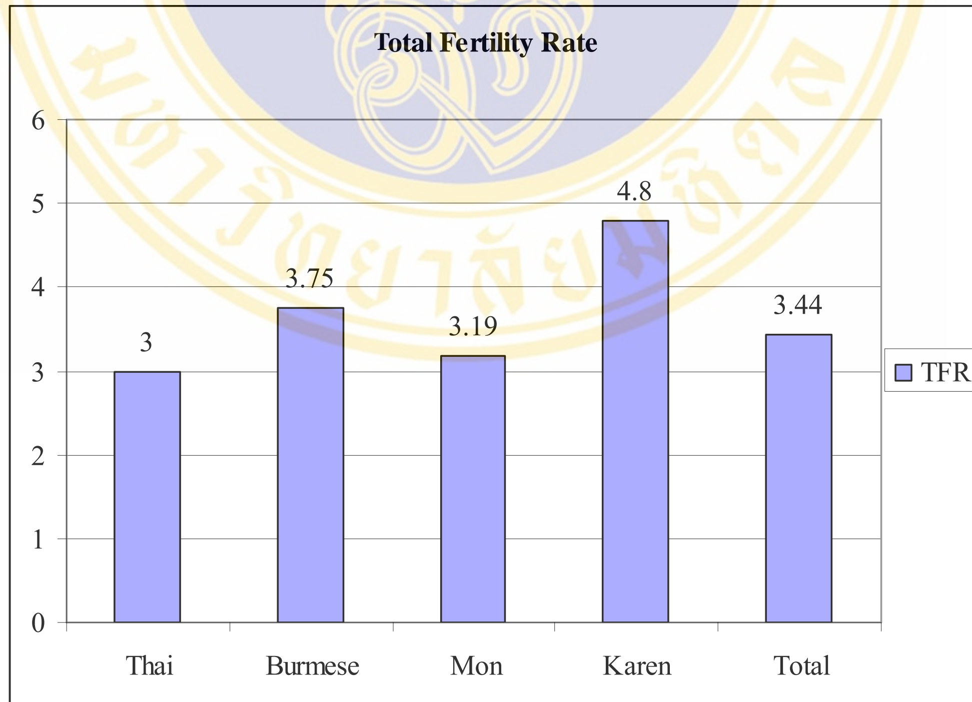

Figure 4.2 Total Fertility Rate of women in highland area of KDSS during July 2002 to August 2003 by ethnic group

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4.2 Demographic, Social, Economic Characteristics and Fertility of Highland Ever-Married Women

4.2.1 Demographic Characteristics

Ethnicity and age

There is the sampling group of 2,418 ever married women in reproductive age between 15 – 49 years old, residing in highland in Kanchanaburi province. Highland women who are Thais account for 60 percent. In addition, ethnicities that are found the most in the highland areas consist of Karen, Mon, and Burmese, which is equivalent to 19.6 percent, 12.4 percent and 7.9 percent, respectively (Table 4.2). The samples are in middle reproductive age whereby 37.2 percent are in the age group of 30-39, followed by the age group of 40-44 (16.3 percent), the age group of 25-29 (16.2 percent), and the least is the age group of 15-19, contributing to 4.2 percent. The populations have an average age of 34 years old. The majority of all ethnicities are in the age group of 30-34 years old. The minority of all ethnicities are the age group in early reproductive age of 15-19 years old, which are Thai women (3.4 percent), Karen (4.0 percent), Burmese and Mon women (8.4 and 5.6, respectively) (Table 4.3).

Table 4.2 Percent and number of highland ever married women in KDSS by ethnicity

Ethnicity	Percent	Number
Thai	60.0	1,452
Burmese	7.9	190
Mon	12.4	301
Karen	19.6	475
Total	**100**	**2,418**

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Table 4.3 Percentage distribution of ever married women in highland area of KDSS by age group and ethnicity

Age group	Ethnicity				
	Thai	Burmese	Mon	Karen	Total
15-19	3.4	8.4	5.6	4.0	4.2
20-24	8.8	17.9	15.3	15.8	11.7
25-29	14.5	14.2	18.6	20.6	16.2
30-34	19.1	17.4	17.6	20.4	19.1
35-39	20.1	15.3	14.6	15.4	18.1
40-44	17.6	16.3	12.3	13.9	16.3
45-49	16.4	10.5	15.0	9.9	14.5
Total (Number)	**100.0 (1,452)**	**100.0 (190)**	**100.0 (301)**	**100.0 (475)**	**100.0 (2,418)**

4.2.2 Social Characteristics

Marital Status and Marital Status by Law

Since this research studies the group of ever married women; therefore, marital status is divided into 2 types, which is married women or women who are living with their husband and women who used to get married which are those who obtain marital status as widowed, divorced and separated. According to Table 4.4, it can be seen that 93.2 percent of all married women are living with their husband and obtain marital status as married. Thai women, Burmese, Mon and Karen women are married and living with their husband, contributing to 91.2, 95.8, 95.3 and 94.3 percent, respectively.

From Table 4.4 and 4.5 presents marital status by law of married women. The majority (67.8 percent) have the most recent marriage without having marriage certificate registration, which is mainly an actual marriage where a couple living together without getting married or get married by tradition but without legal

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registration of marriage. In addition to legal registration of marriage among Thai people, an ethnic group that has legal registration of marriage the most is Karen.

In term of family structure of highland women(table 4.6), two-third or 69.6 percent has the family structure which is a nuclear family, and 30.4 percent is an extended family in which family members consist of relatives. It is found that all ethnic groups have a nuclear family structure rather than an extended family structure. In term of extended family, Thai women have extended family the most, followed by Karen family, Mon family, and Burmese family, contributing to 35.6, 26.2, 24.2 and 12.6, respectively.

In term of language spoken in household based on ethnicity (table4.4), it is found that each ethnic group tends to have its own language whereby the language of each ethnicity is used for communication in household. For example, 59.0 percent use Central-Thai language and Northeastern-Thai language in household. People who use Central-Thai language and Northeastern-Thai language are the people whose race is Thai.

Table 4.4 Percent and number of ever married women by marital status by law and language in house

Marital status by law	**Percent**	**Number**
Registration	32.2	725
No registration	67.8	1,528
Total	**100**	**2,253**
Language in household	**Percent**	**Number**
Central-Thai	50.1	1,212
Northeastern-Thai	8.9	214
Mon	10.0	244
Burmese	5.5	132
Karen	23.0	555
Other language	2.5	61
Total	**100**	**2,418**

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Table 4.5 Percentage distribution of ever married women by marital status and ethnicity

Marital Status	Ethnicity				
	Thai	**Burmese**	**Mon**	**Karen**	**Total**
Married	92.0	95.8	95.3	94.3	93.2
Widowed/Divorced/Separated	8.0	4.2	4.7	5.7	6.8
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table 4.6 Percentage distribution of ever married women family structure and ethnicity

Family Structure	Ethnicity				
	Thai	**Burmese**	**Mon**	**Karen**	**Total**
Nuclear Family	64.4	87.4	75.8	73.8	69.6
Extended Family	35.6	12.6	24.2	26.2	30.4
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100**
(Number)	**(1,452)**	**(190)**	**(301)**	**(475)**	**(2,418)**

Education

Married women aged between 15 – 49 years old are uneducated, which is accounted for 40.7 percent. The majority of those who attended school graduated from primary school level as their parents work in the agricultural field and do not perceive the importance of education. Also, there are constraints relating to a great distance from a village to a school with topographical characteristics distanced from development, which do not support the education. Therefore, parents only prefer their children to obtain primary education level. There are only 13.2 percent of women who are graduated at secondary school level or above whereby the majority is Thai women and there are also some groups of married women who are studying (13 women) from table 4.7.

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When consider the highest education level in each ethnicity, uneducated women are found the most among Mon women (87.0 percent), followed by Burmese women (80.0 percent) and Karen women (78.9 percent). It is also found that the majority of Thai women would obtain the highest education level at primary school and high school or above, contributing to 65.9 and 20.9 percent, respectively.

When compare within the minority groups (Burmese, Mon, and Karen), the highest education level of Karen is secondary school level or above, which is greater than Mon and Burmese people. At the same time, the highest education level is above secondary school or higher whereby the majority accounts for the education of Thai women of 20.9 percent. It is also found that Burmese, Karen, and Mon women would obtain relatively low education level (as they do not perceive the importance of education and only study in order to become literate in Thai language) as it can be seen that the highest education level is only primary school level whereby Burmese women accounts for 20.0 percent; Karen women accounts for 17.9 percent; and Mon women accounts for 12.3 percent (Table 4.8).

Table 4.7 Percent and number of highland women by education Status

Education Status	Percent	Number
Studying	0.5	13
Completed education	99.5	2,405
Total	**100**	**2,418**

Table 4.8 Percentage distribution of ever married women by education level and ethnicity

Education Level	Ethnicity				
	Thai	Burmese	Mon	Karen	Total
Uneducated	13.2	80.0	87.0	78.9	40.7
Primary school	65.9	20.0	12.3	17.9	46.1
Secondary school or above	20.9	0.0	0.7	3.2	13.2
Total (Number)	**100.0 (1,439)**	**100.0 (190)**	**100.0 (301)**	**100.0 (475)**	**100 (2,405)**

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4.2.3 Economic Characteristics

Within the total number of 2,418 married women aged 15-49, working women account for 1,650 persons or 68.2 percent, and those who are not working women contribute to 768 persons or 31.8 percent (Table 4.9). Ever ethnicity will have the number of working women greater than those who are not working women. The majority of women who are not working are housewives working at home and some of them are pregnant and raising their children at home. Almost half of working women (47.6 percent) work in paddy field, crop field or garden. 3/4 of working women or 72.2 percent work in the agricultural field such as paddy farming, sugar cane and cassava plantation. There are also other occupations apart from agriculture, which contribute to 27.8 percent. For examples, government officials account for 5.3 percent; service areas contribute to 5.8 percent; and merchants account for 7.9 percent. All ethnicities work mainly in agricultural field. For examples, Karen working in agricultural field (79.2 percent), Mon (77.3 percent), Burmese (72.8 percent) and Thai people (69.6 percent), incrementally. In addition, it is also found that people from each ethnicity also slightly work outside the agricultural field (Table 4.10)

Table 4.9 Percent and number of highland women by work status

Work status	Percent	Number
Working	68.2	1,650
Not work	31.8	768
Total	**100**	**2,418**

Table 4.10 Percentage distribution of ever married women by occupation and ethnicity

Occupation	Ethnicity				
	Thai	**Burmese**	**Mon**	**Karen**	**Total**
Agricultural	69.6	72.8	77.3	79.2	72.2
No agricultural	30.4	27.2	22.7	20.8	27.8
Total (Number)	**100.0 (1,097)**	**100.0 (114)**	**100.0 (179)**	**100.0 (260)**	**100 (1,650)**

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Family's Economic Status and Amount of agricultural land holdings

Overall, married women aged 15-49 have economic family status similarly in two groups; the group with middle economic family status and the group with high economic status accounts for 39.1 and 34.0 percent, respectively. When consider by ethnicity, Karen women have the lowest economic family status comparing to other ethnic groups, which is 63.1 percent, followed by Burmese, Mon and Thai women. Thai women account for the highest proportion of high economic status and middle economic family status, which is 47.5 and 42.2 percent. When take family income into account, more than half of highland women obtain income more than 100,000 Baht. The majority is Thai women and Karen women. An average annual income of highland women is approximately 46,000 Baht.

Amount of agricultural land holdings is the area used for agricultural activities whereby landownership characteristics is self-ownership, land rental for agriculture, or parental ownership as well as the land permitted by the government for temporary exploitation. Overall, size of landownership at each level of highland women is similar in which the size of landownership less than 2,800 square inches, from 2,800 to 8,000 square inches, and more than 8,000 square inches accounts for 34.2, 31.9 and 33.9, respectively. When consider by ethnicity, almost half of Karen women (45.9 percent) have the size of land ownership less than 2,800 square inches, and 49.4 percent of Burmese women have the size of landownership more than 8,000 square inches, which is the highest. Thai women and Mon women have the size of landownership in each range slight different (Table 4.12).

Table 4.11 Percentage distribution of ever married women by family economic status and ethnicity

Family economic status	**Ethnicity**				
	Thai	**Burmese**	**Mon**	**Karen**	**Total**
Low	10.3	59.8	54.3	63.1	26.9
Middle	42.2	36.1	39.7	27.2	39.1
High	47.5	4.1	6.0	9.7	34.0
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
(Number)	**(1,153)**	**(122)**	**(184)**	**(268)**	**(1,709)**

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Table 4.12 Percentage distribution of ever married women by amount of agricultural and ethnicity

Amount of agricultural land holdings	Ethnicity				
	Thai	**Burmese**	**Mon**	**Karen**	**Total**
less than 2,800 square	29.9	39.0	34.1	45.9	34.2
2,800-8,000 square	34.5	11.7	35.9	26.6	31.9
more than 8,000 square	35.6	49.4	30.0	27.5	33.9
Total.	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
(Number)	**(1,082)**	**(77)**	**(170)**	**(357)**	**(1,686)**

4.2.4 Fertility Behavior

Age at First Marriage

When consider age at first marriage, the majority got married at an early age. More than half (57.3 percent) of the samples first got married at the age between 15 – 19 years old. An early age of marriage of highland women can affect higher fertility because the duration of having children in longer. According to the survey, it is also found that the oldest age of marriage is 46 years old and the lowest age is 11 years old. Moreover, highland women prefer getting married at the age of 18 the most. First marriage of all ethnicities also occurs prior to reproductive age in which age at first marriage is 11 – 14 years old. Women from each ethnicity usually first got married during 15 – 19 years old whereby Thai women account for 54.8 percent, Karen women (61.6 percent), Mon women (65.0 percent) and Burmese women (52.0 percent) (Table 4.13).

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Table 4.13 Percentage distribution of ever married women by age at first marriage and ethnicity

Age at First Marriage	Ethnicity				
	Thai	Burmese	Mon	Karen	Total
Lower 15 years	2.7	4.4	4.5	3.1	3.2
15-19	54.8	52.0	65.0	61.6	57.3
20-24	30.3	35.4	24.1	26.1	29.1
25-29	9.7	5.0	5.9	7.4	8.4
30-34	1.9	1.7	0.0	1.1	1.5
35-39	0.5	0.6	0.3	0.7	0.5
40-44	0.1	0.0	0.0	0.0	0.0
45-49	0.0	0.0	0.0	0.0	0.0
Total (Number)	**100.0 (1,335)**	**100.0 (181)**	**100.0 (286)**	**100.0 (448)**	**100.0 (2,250)**

Pregnancy and Pregnancy Result

The survey on pregnancy experience, pregnancy behavior, and pregnancy result of highland women showed that there is 4.8 percent of highland women who are pregnancy, 3.6 percent of women who are never pregnant, and 91.6 percent of women who used to be pregnant 1-16 times. One woman has an average pregnancy of approximately 3 times.

96.4 percent or 2,327 women who used to be pregnant and are pregnant have the total pregnancies of 6,409 times with pregnancy result, which is stillbirth (2.2 percent), live birth (81.8 percent) and miscarriage or other causes (10.9 percent). Among all pregnancies, it is found that women who are currently pregnant contribute to 5.1 percent (Table 4.14).

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Table4.14 Percent and number highland women by pregnancy experience and pregnancy behavior

Pregnancy experience	Percent	Number
pregnant	91.6	2,211
never pregnant	3.6	86
pregnancy	4.8	116
Total	**100**	**2,413**
Pregnancy behavior	**Percent**	**Number**
live birth	81.8	1,831
stillbirth	2.2	48
miscarriage or other causes	10.9	242
currently pregnant	5.1	116
Total	**100**	**2,327**

Contraception Experience

From Table 4.15, the majority of highland women (86.2 percent) used to have contraception while those who have never used any contraception account for only 13.8 percent. More than half of women who used to have contraception (55.9 percent) use temporary birth control method, which is contraceptive pills as the first birth control method, followed by contraceptive injection (27.0 percent). The reason for using contraceptive pills and contraceptive injection as the first means of contraception is to be exempted from pregnancy period. Contraception by means of condom is still not widely found among men, which is only 0.6 percent, as men usually perceive that contraception is their wife's responsibility. Condom usage only occurs with women who are not their wife in order to prevent HIV infection. They perceive that having sexual intercourse with their wife is safe from HIV infection; therefore, there is no need for condom usage. They do not have recognition toward the benefit of condom in preventing from pregnancy. Temporary contraception by natural method such as external ejaculation and safe-period counting accounts for 1.6 percent, which is greater than contraception by means of condom usage. It is also found that

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some groups of highland women use permanent birth control method as their first means of contraception by having female sterilization as high as 9.4 percent, which indicates that highland women use contraception method not to be exempted from pregnancy period but when they have enough number of children according to their needs. They do not use temporary birth control method to be exempted from pregnancy period; instead, they use female sterilization to stop having children.

Thai women used to have contraception the most, which is 94.1 percent, followed by Mon women (84.1 percent), Burmese women (74.7 percent) and Karen women (67.8 percent), and 13.8 percent of women who never have contraception are categorized by ethnicity. Karen is the ethnicity that never has contraception, which is higher than Burmese, Mon and Thai (32.2, 25.3, 15.9 and 5.9 percent, respectively). The most popular first birth control method in all ethnicities is contraceptive pills and contraceptive injection. Thai women use contraceptive pills (57.7 percent) and contraceptive injection (25.6 percent). Karen women use contraceptive pills (53.3 percent) and contraceptive injection (26.7 percent). Mon women use contraceptive pills (53.6 percent) and contraceptive injection (31.0 percent). Burmese women use contraceptive pills (44.0 percent) and contraceptive injection (34.0 percent). The first birth control method by female sterilization is still widely found among Burmese women and vasectomy is slightly found among Thai women group. The first birth control method by condom usage is slightly found among Thai women (0.7 percent) whereas condom usage is not found in Karen group and Mon group.

It is also found in current contraception that Karen women do not commonly use contraception at present whereby the percentage is higher than other groups, equivalent to 28.9 percent (Table 4.16) because in the future Karen women still want to have more children of any gender, preferably male to female. This is because Karen society believes that male will carry on father's ancestry.

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Table 4.15 Percentage of highland women with contraception experience and first contraceptive method by ethnicity

Contraception experience	**Ethnicity**				
	Thai	**Burmese**	**Mon**	**Karen**	**Total**
Ever use of contraceptive	94.1	74.7	84.1	67.8	86.2
Never use of contraceptive	5.9	25.3	15.9	32.2	13.8
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
First contraceptive method					
Legation	8.4	16.3	10.3	9.9	9.4
Vasectomy	1.2	0.0	0.0	0.6	0.8
Sub dermal Implant	1.8	1.4	1.6	4.7	2.2
Injection	25.6	34.0	31.0	26.7	27.0
IUD	2.2	1.4	1.2	0.9	2.5
Pill	57.7	44.0	53.6	53.3	55.9
Condom	0.7	1.4	0.0	0.0	0.6
Withdrawal	0.5	0.7	1.6	0.9	0.7
Rhythm	0.8	0.7	0.8	0.9	0.8
Vaginal Methods	0.1	0.0	0.0	0.0	0.0
Withdrawal & Rhythm	0.2	0.0	0.0	0.0	0.1
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

In term of the situation of current contraception, 2/3 of highland women or 79.2 percent are currently using contraception. Age group that usually has contraception is 30 – 34 years old, and women who are not currently using contraception (20.8 percent) are between 25 – 29 years old. At present, Karen women have contraception lower than Thai, Burmese and Mon women, equivalent to 71.1 percent which is less than 80.9, 81.6 and 79.2 percent, respectively (Table 4.16).

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Table 4.16 Percentage distribution of ever married women by current contraceptive status and ethnicity

Current contraceptive status	Ethnicity				
	Thai	Burmese	Mon	Karen	Total
Currently using contraception	80.9	81.6	79.4	71.1	79.2
Not currently using contraceptive	19.1	18.4	20.6	28.9	20.8
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

In Table 4.17, it is found that highland women currently use birth control method of contraceptive injection and contraceptive pills at a similar percentage of 22.3 percent and 23.5 percent, respectively, followed by tubal sterilization (18.8 percent). The major reason for not using contraception of highland women is due to current pregnancy and the desire to have children.

Table 4.17 Percentage distribution of ever married women by current contraceptive method and Ethnicity

Current contraceptive method	Ethnicity				
	Thai	Burmese	Mon	Karen	Total
Legation	23.3	19.4	15.7	13.7	18.8
Vasectomy	2.0	0.5	0.0	1.8	1.4
Sub dermal Implant	2.3	1.2	5.7	6.8	3.8
Injection	19.3	26.4	24.7	22.5	22.3
IUD	1.9	3.1	1.2	2.1	2.1
Pill	23.1	20.0	25.7	19.8	23.5
Condom	0.7	0.5	0.0	0.2	0.5
Other method	1.7	5.4	1.5	1.8	3.2
Amenorrhea use contraceptive	6.6	5.1	4.9	2.4	3.6
No use contraceptive	19.1	18.4	20.6	28.9	20.8
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

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2,211 highland women who used to be pregnant have the number of ever born children from 0-16 children, with an average number of ever born children equivalent to 3, which is higher than the number of ever born children of general Thai women. It can be said that cumulative fertility of highland women is approximately 3 children; pregnancy is equivalent to approximately 3 times; miscarriage and the number of ever born children is 2.75; children death is 0.21 and live birth is 2.56, respectively. All age group will have miscarriage whereby the age group of 45-49 has the most miscarriage of 0.3. It can be seen that the number of pregnancy, miscarriage, ever born children, ; children death, and live birth have the relationships in the same direction as the age of women, which is increased according to an increase in age (Table 4.18).

Table 4.18 Mean number of pregnancy, miscarriage, children ever born, children death and live birth highland women by age group

Age group	Pregnancy	Miscarriage	Children ever born	Children death	Live birth
15-19	1.22	0.06	0.92	0.02	0.89
20-24	1.58	0.06	1.40	0.05	1.34
25-29	2.17	0.11	1.97	0.11	1.89
30-34	2.73	0.15	2.56	0.12	2.44
35-39	3.15	0.14	2.99	0.19	2.82
40-44	3.93	0.24	3.69	0.38	3.33
45-49	4.28	0.30	3.97	0.40	3.59
Mean	**2.97**	**0.17**	**2.75**	**0.21**	**2.56**

Table 4.19 presents the average number of pregnancy, miscarriage, ever born children; children death, and live birth of highland Thai women. It is found that Thai women residing in the highland areas who are aged between 15 – 19 years old have no children death report .However children death is rarely found in each age group. There is pregnancy, miscarriage, ever born children, children death, and live birth at

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an average of 2.35, 0.15, 2.16, 0.07 and 2.10 respectively. The trend of pregnancy, ever born children, children death, and live birth is more likely to increase according to age, except some age range of miscarriage in which miscarriage will decline at aged 35-39 and will increase afterwards.

Table 4.19 Mean number of pregnancy, miscarriage, children ever born, children death and live birth by age group of Thai women

Age group	Pregnancy	Miscarriage	Children ever born	Children death	Live birth
15-19	1.12	0.05	0.95	0.00	0.95
20-24	1.41	0.07	1.25	0.02	1.23
25-29	1.91	0.12	1.71	0.02	1.71
30-34	2.33	0.17	2.16	0.03	2.14
35-39	2.71	0.14	2.56	0.08	2.50
40-44	3.15	0.23	2.93	0.10	2.84
45-49	3.82	0.27	3.56	0.25	3.32
Mean	**2.35**	**0.15**	**2.16**	**0.07**	**2.10**

As for highland Burmese women (Table 4.20), it is found that Burmese women used to be pregnant as high as 9 times whereby Burmese women have an average of 3 pregnancies per woman. Women in the age group between 15 – 19 years old do not have any experience relating to miscarriage and ; children death. The average number of miscarriage is equivalent to 0.11 times; the number of ever born children is equivalent to 2.78; children death is 0.27; and live birth is 2.53.

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Table 4.20 Mean number of pregnancy, miscarriage, children ever born, children death and live birth by age group of Burmese women

Age group	Pregnancy	Miscarriage	Children ever born	Children death	Live birth
15-19	1.36	0.00	0.82	0.00	0.82
20-24	1.69	0.13	1.47	0.13	1.34
25-29	2.04	0.07	2.00	0.15	1.85
30-34	2.94	0.06	2.81	0.31	2.50
35-39	4.10	0.10	3.97	0.38	3.66
40-44	4.25	0.07	4.18	0.39	3.79
45-49	4.55	0.30	4.25	0.50	3.75
Mean	**2.99**	**0.11**	**2.78**	**0.27**	**2.53**

Mon women have the highest number of pregnancy in the age group of 40-44, which is approximately 5 times. The pattern of miscarriage is uncertain unlike other ethnic groups whereby it is found that the age group with the most miscarriage is 40-44 years old and 15-19 years old with an average of 0.4 and 0.2, respectively. The number of children death and the number of live birth are widely found in the age group of 40-44. It can be seen that the age group of 40-44 of Mon women is the age group that have the most vital events, which is pregnancy, miscarriage, ever born children, children death and live birth (Table 4.21).

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Table 4.21 Mean number of pregnancy, miscarriage, children ever born, children death and live birth by age group of Mon women

Age group	Pregnancy	Miscarriage	Children ever born	Children death	Live birth
15-19	1.30	0.20	0.90	0.10	0.80
20-24	1.55	0.02	1.34	0.09	1.25
25-29	1.98	0.02	1.89	0.09	1.82
30-34	3.00	0.08	2.89	0.19	2.70
35-39	3.36	0.05	3.25	0.34	2.91
40-44	5.23	0.40	4.83	0.80	4.03
45-49	4.78	0.13	4.64	0.64	4.02
Mean	**3.03**	**0.13**	**2.82**	**0.32**	**2.50**

Karen women in all age groups have vital event higher than other ethnicities. Karen women have high pregnancy during the age of 40-44; have the equal number of miscarriage in the age group of 25-29 and of 30-34, which is 0.18; and the equal number of children death in the age group of 15-19 and of 20-24, which is 0.08, and the highest is in the age group of 40-44, which is 1.23 (Table 4.22).

Table 4.22 Mean number of pregnancy, miscarriage, children ever born, children death and live birth by age group of Karen women

Age group	Pregnancy	Miscarriage	Children ever born	Children death	Live birth
15-19	1.38	0.08	0.92	0.08	0.85
20-24	1.84	0.07	1.66	0.08	1.58
25-29	2.87	0.18	2.57	0.31	2.33
30-34	3.70	0.18	3.44	0.32	3.14
35-39	4.40	0.21	4.18	0.47	3.72
40-44	6.06	0.31	5.75	1.23	4.63
45-49	6.04	0.67	5.36	0.93	4.47
Mean	**3.76**	**0.24**	**3.41**	**0.49**	**2.96**

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When compare children's vital event of women of four ethnicities by group, it is found that the pattern of pregnancy is similar in all four ethnicities which will increase according to age, except Karen women that have the most pregnancy in the age group of 40-44. In term of miscarriage, it is found that both Thai and Burmese women in the age group of 15-19 have no infant mortality. The pattern of the number of ever born children and live birth is similar in all ethnicities, which is increased according to an increase in age.

Table 4.23 Mean number of pregnancy, miscarriage, children ever born, children death and live birth by ethnicity.

Ethnicity	Pregnancy	Miscarriage	Children ever born	Children death	Live birth
Thai	2.35	0.15	2.16	0.07	2.10
Burmese	2.99	0.11	2.78	0.27	2.53
Mon	3.03	0.13	2.82	0.32	2.50
Karen	3.76	0.24	3.41	0.49	2.96
Mean	**3.03**	**0.16**	**2.79**	**0.29**	**2.52**

Table 4.23 when consider highland women by ethnicity in details, it is found that Karen women have pregnancy, miscarriage, ever born children, ; children death and live birth higher than other ethnicities, which is equivalent to 3.76, 0.24, 3.41, 0.49 and 2.96, respectively. When compare between Thai women and minority groups (Karen, Burmese, and Mon), results show that Thai women have pregnancy, ever born children, children death and live birth lower than three minority groups (Karen, Burmese, and Mon), especially the number of children death is very low (0.07) but miscarriage of Thai women is slightly different from Burmese and Mon women, which is 0.15, 0.11 and 0.13, respectively. Miscarriage of women from three minority groups is lower than miscarriage of Karen women because Thai, Burmese and Mon women have better education than Karen women; therefore, they tend to have

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knowledge and understanding toward contraception and reproductive health as well as gain better access to services than Karen women and correctly employ them.

4.3 Multiple Regression Analysis of Factors affecting Fertility

In the analysis of factors affecting fertility of highland women in Kanchanaburi province, which are measured by the number of ever born children of women who used to get married, such factors include: 1) Population factors including age, ethnicity and marital status; 2) Intermediate variables of fertility consisting of age at first marriage, children death and contraception and; 3) Social and economic factors including education level, occupation, family structure, economic status, and amount of agricultural land holdings . The analysis is divided into two parts. The first part is the analysis of overall fertility of all highland women in order to examine an effect of ethnicity on the difference in fertility. The second part is the analysis of factors affecting fertility in each ethnicity in order to determine factors that identify fertility in each ethnicity, by using multiple regression analysis whereby each part is divided into 2 models. The first model involves the analysis by using population factors relating to age, ethnicity, and marital status, and intermediate variables of fertility including age at first marriage, infant mortality, stillbirth, and contraception in order to determine the factors that have an effect on fertility. The second model takes social and economic factors into account, which consist of education level, occupation, family structure, economic status, amount of agricultural land holdings, in order to find out whether social and economic factors will have any relationships with fertility when population factors and intermediate variables of fertility are controlled. However, in the analysis of every model population factor relating to marital status is taken out from the model because the number of women who were widowed, divorced and separated is very few and, therefore, can not be used in the analysis.

4.3.1 Factors Affecting Fertility of Highland Women

From Table 4.24, in the first model when analyze variables relating to age, ethnicity, and marital status, and intermediate variables of fertility which are age at first marriage, children death , and contraception (independent variable) in order to

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determine whether there is the relationship with fertility, measured by the number of ever born children (dependent variable), or not. According to the analysis, it is found that demographic variable relating to age has a positive relationship with the number of ever born children. Burmese, Mon, Karen women have the number of ever born children greater than Thai women. Intermediate variable of fertility relating to age at first marriage has a negative relationship with the number of ever born children. The numbers of children death and contraception usage have a positive relationship with the number of ever born children at statistical significance level of 0.01. In this model, independent variables can explain variability in dependent variables by 60 percent (R^2 = 0.599).

In the analysis of the second model, which added social and economic factors into independent variables, it is found that independent variables can explain variability of dependent variables by 58 percent (R^2 = 0.579), which is declined from the first model. This is probably because some variables become less important such as ethnicity and contraception usage. However, additional social variable that has the significant relationship consists of only one variable, which is education level of women.

Results of multiple regression analysis in the second model can explain that when other variables are constant, age will have a positive relationship whereby when age increases 1 year the number of ever born children in increase by 0.11. Karen women have the number of ever born children more than Thai women equivalent to 0.80 times. Age at first marriage has a negative relationship with the number of ever born children. If women postpone age at first marriage one year, the number of ever born children will decline by 0.10. The number of children death has a positive relationship with the number of ever born children. Women with one children death will have the number of children increases by 1.01. Women who are graduated at a primary school level will have the number of ever born children less than those who are uneducated, which is equivalent to 0.22 times. Women who are graduated at a secondary school level or above have the number of ever born children less than those who are uneducated by 0.34.

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Independent variable has an effect on dependent variable in the first model but does not affect dependent variable in the second model. When adding social and economic factors in the second model and other variables are constant, it is found that Mon and Burmese women have no difference in relation to the number of ever born children with Thai women and condom usage also has no significant relationship with the number of ever born children.

Moreover, variables relating to economic characteristics, which are occupation, family structure, economic status, and amount of agricultural land holdings, have no effect on the difference in the number of ever born children of highland women.

Table 4.24 Multiple regression analysis of factors affecting fertility of ever-married women aged 15-49 in highland KDSS

Variable	**Model 1**		**Model 2**	
	B	Std. Error	B	Std. Error
Constant	0.62**	0.15	0.75**	0.25
Age	0.11**	0.00	0.11	0.01
Ethnicity				
Thai = Ref.				
Burmese	0.50**	0.90	0.24	0.20
Mon	0.40**	0.07	0.23	0.14
Karen	1.00**	0.07	0.80**	0.13
Age at First Marriage	-0.11**	0.01	-0.10**	0.01
Number of child deaths	1.00**	0.04	1.01**	0.06
Ever use of contraceptive				
Ever of contraceptive = Ref.				
Never contraceptive	-0.20**	0.08	-0.18	0.13

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Table 4.24 Multiple regression analysis of factors affecting fertility of ever-married women aged 15-49 in highland KDSS (Cont.)

Variable	Model 1	Model 2
Education level		
Uneducated = Ref.		
Primary school	-0.22*	0.10
Secondary school or above	-0.34*	0.14
Occupation		
Agricultural = Ref.		
No Agricultural	-0.13	0.09
Family structure		
Nuclear Family = Ref.		
Extended Family	0.10	0.08
Family economic status		
Low = Ref.		
Middle	-0.02	0.10
High	-0.13	0.12
Amount of agricultural land holdings	2.12E-07	0.00

Note: significant * $P \leq 0.05$; ** $P \leq 0.001$

Model 1 R^2 = 0.599 SSE =2522.21 df= 7 F = 460.261

Model 2 R^2 = 0.579 SSE =1335.33 df= 14 F = 106.50

4.3.2 Factor Affecting Fertility of Thai Women

Table 4.25 illustrates analysis results of factors affecting fertility of Thai women. It is found that demographic variable regarding age, and intermediate variables of fertility consisting of age at first marriage, children death , and contraception have the relationship with the number of ever born children at statistical significance level of 0.01, except variable regarding previous contraception usage has no significant relationship with the number of ever born children.

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In the second model, when adding social and economic factors into the analysis, it is found that age, age at first marriage, the number of children death and education level of women have the relationship with the number of ever born children whereby when age increases one year, the number of ever born children of Thai women will increase by 0.09. When Thai age at first marriage demographic one year, the number of ever born children will decline by 0.10. Thai women, that have the number of infant mortality or stillbirth equivalent to 1, will have the number of ever born children increases by 1.12. Thai women who are graduated at a primary school level have the number of ever born children less than uneducated Thai women by 0.24 whereas Thai women who are graduated at a secondary school level or higher have the number of ever born children less than uneducated Thai women by 0.44. On the other hand, previous contraception usage, occupation, family structure, economic status, and amount of agricultural land holdings have no difference regarding the number of ever born children of women.

As for the ability to explain variability of the number of ever born children of Thai women, the first model involving population factors relating to age and marital status, and intermediate variables of fertility including age at first marriage, children death and contraception can explain variability of dependent variables by 46 percent (R^2 = 0.460). When adding social and economic variables in the second model, all independent variables can explain variability of dependent variables by 47 percent (R^2 = 0.469).

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Table 4.25 Multiple regression analysis of factors affecting fertility of ever-married Thai women aged15-49 in highland area of KDSS.

Variable	Model 1		Model 2	
	B	Std. Error	B	Std. Error
Constant	1.15**	0.17	1.35**	0.30
Age	0.09**	0.00	0.09**	0.01
Age at First Marriage	-0.10**	0.01	-0.10**	0.01
Number of child deaths	1.11**	0.09	1.12**	0.11
Ever use of contraceptive				
Ever of contraceptive = Ref.				
Never contraceptive	-0.24	0.14	0.06	0.23
Education level				
Uneducated = Ref.				
Primary school			-0.24*	0.12
Secondary school or above			-0.44**	0.15
Occupation				
Agricultural = Ref.				
No Agricultural			-0.05	0.10
Family structure				
Nuclear Family = Ref.				
Extended Family			0.09	0.08
Family economic status				
Low = Ref.				
Middle			0.50	0.15
High			-0.05	0.15
Amount of agricultural land holdings			1.16E-07	0.00

Note :significant $* P \leq 0.05$; $** P \leq 0.001$

Model 1 R^2 =0.4600 SSE = 1241.1 df= 4 F = 275.12

Model 2 R^2 =0.4690 SSE = 759.40 df= 11 F = 60.02

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4.3.3 Factors Affecting Fertility of Burmese Women

According to Table 4.26, in the first model, all of population variables and intermediate variables of fertility have the relationship with the number of ever born children at statistical significance level of 0.01. In this model, variability of all independent variables can explain variability of dependent variables by 65 percent (R^2 = 0.650).

The addition of social and economic factors in the analysis of the second model shows that factors affecting fertility of Burmese women are age, age at first marriage, the number of children death , and previous contraception usage. If Burmese women have age increases by one year, the number of ever born children will increase by 0.15. If Burmese women postpone age at first marriage one year, the number of ever born children will decline by 0.11. Burmese women with children death equivalent to 1 will have the number of ever born children increases by 1.4. It is noticeable that previous contraception usage has the relationship with the number of ever born children in the opposite direction to our assumption in which women who never have contraception have lower fertility than women who use to have contraception. In the second model, variability of all independent variables can explain variability of dependent variables slightly higher by 67 percent (R^2 = 0.674).

On the other hand, independent variables relating to social and economic variables, including education level, occupation, family structure, economic status of the family, and amount of agricultural land holdings have no significant relationship with the number of ever born children among Burmese women group

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Table 4.26 Multiple regression analysis of factors affecting fertility of ever-married Burmese women aged15-49 in highland area of KDSS.

Variable	Model 1		Model 2	
	B	Std. Error	B	Std. Error
Constant	0.71	0.45	-0.48	1.10
Age	0.15**	0.01	0.15**	0.03
Age at First Marriage	-0.14**	0.03	-0.11*	0.06
Number of child deaths	0.84**	0.12	1.40**	0.32
Ever use of contraceptive				
Ever of contraceptive = Ref.				
Never contraceptive	-0.58**	0.20	-0.84*	0.45
Education level				
Uneducated = Ref.				
Primary school				
Secondary school or above			0.02	0.48
Occupation				
Agricultural = Ref.				
No Agricultural			-0.37	0.59
Family structure				
Nuclear Family = Ref.				
Extended Family			0.74	0.50
Family economic status				
Low = Ref.				
Middle			0.01	1.43
High			-0.22	1.43
Amount of agricultural land holdings			4.34E-07	0.00

Note :significant * P ≤ 0.05 ; ** P ≤ 0.001

Model 1 R^2 =0.6500 SSE = 184.05 df= 4 F = 77.44

Model 2 R^2 =0.6740 SSE = 45.82 df= 10 F = 7.02n

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4.3.4 Factors Affecting Fertility of Mon Women

According to Table 4.27, the first model displays analysis results of factors affecting fertility of Mon women. It is found that demographic variables relating to age, and intermediate variable including age at first marriage, children death have the relationship with the number of ever born children at statistical significant level of 0.01, except variable relating to contraception which has no significant relationship with the number of ever born children.

In the second model, when adding social and economic factors into the analysis, it is found that only age, age at first marriage, and children death have the relationship with the number of ever born children whereby when age increases by one year Mon women will have the number of ever born children increases by 0.12. When Mon women postpone age at first marriage one year, the number of ever born children will decline by 0.13. Mon women who have infant mortality or stillbirth equivalent to 1 will want to have more children by 0.53. On the other hand, previous contraception usage, education level, occupation, family structure, economic status, and amount of agricultural land holdings have no difference in relation to the number of ever born children of women.

As for the ability to explain variability of the number of ever born children of Mon women, the first model involving population factors relating to age and marital status, and intermediate variables of fertility including age at first marriage, children death , and contraception can explain variability of dependent variables by 66 percent (R^2 = 0.6610). When adding social and economic variables into independent variables (in the second model), it is found that independent variables can explain variability of dependent variables by 54 percent (R^2 = 0.538).

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Table 4.27 Multiple regression analysis of factors affecting fertility of ever-married Mon women aged15-49 in highland area of KDSS.

Variable	Model 1		Model 2	
	B	Std. Error	B	Std. Error
Constant	0.63	0.43	1.17	0.95
Age	0.14**	0.01	0.12**	0.02
Age at First Marriage	-0.14**	0.02	-0.13**	0.04
Number of child deaths	0.78**	0.09	0.53**	0.19
Ever use of contraceptive				
Ever of contraceptive = Ref.				
Never contraceptive	0.12	0.19	0.26	0.47
Education level				
Uneducated = Ref.				
Primary school				
Secondary school or above			0.25	0.36
Occupation				
Agricultural = Ref.				
No Agricultural			-0.17	0.40
Family structure				
Nuclear Family = Ref.				
Extended Family			-0.01	0.31
Family economic status				
Low = Ref.				
Middle			-0.01	0.28
High			0.76	0.54
Amount of agricultural land holdings			-4.59E-07	0.00

Note: significant * $P \le 0.05$; ** $P \le 0.001$

Model $_1$ R^2 =0.6610 SSE = 328.08 df= 4 F = 131.61

Model $_2$ R^2 =0.5380 SSE = 158.83 df= 10 F = 10.95

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4.3.5 Factors Affecting Fertility of Karen Women

According to Table 4.28, the first model displays analysis results of factors affecting fertility of Karen women. It is found that population variables relating to age, and intermediate variable including age at first marriage, children death have the relationship with the number of ever born children at statistical significant level of 0.01, except variable regarding previous contraception usage has no significant relationship with the number of ever born children.

In the second model, when adding social and economic factors into the analysis of Karen women, it is found that age, age at first marriage, children death , and contraception affect fertility of Karen women whereby when age increases one year, the number of ever born children of Karen women will increase by 0.17. If Karen women postpone age at first marriage one year, the number of ever born children will decline by 0.09. Karen women with children death equivalent to 1 will want to have more children by 0.94. Karen women who never have contraception will have the number of ever born children less than Karen women who used to have contraception by 0.55. Other independent variables, which are education level, occupation, family structure, economic status, and amount of agricultural land holdings, have no effect on the number of ever born children of Karen women.

As for the ability to explain variability of the number of ever born children of Karen women, the first model involving population factors relating to age and marital status, and intermediate variables of fertility including age at first marriage, children death can explain variability of dependent variables by 49 percent (R^2 = 0.4930). When adding social and economic variables in the second model, it is found that variable relating to contraception has the relationship with the number of ever born children at statistical significance level of 0.01. Social and economic variables, including education level, occupation, family structure, economic status of the family, and amount of agricultural land holdings have no significant relationship with the number of ever born children among Karen women group. In the second model,

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variability of all independent variables can explain variability of dependent variables by 70 percent ($R^2 = 0.7040$).

Table 4.28 Multiple regression analysis of factors affecting fertility of ever-married Karen women aged15-49 in highland area of KDSS.

Variable	**Model 1**		**Model 2**	
	B	Std. Error	B	Std. Error
Constant	0.87*	0.38	-0.36	0.61
Age	0.15**	0.01	0.17**	0.01
Age at First Marriage	-0.14**	0.02	-0.09**	0.03
Number of child deaths	0.94**	0.06	0.94**	0.09
Ever use of contraceptive				
Ever of contraceptive = Ref.				
Never contraceptive	-0.18	0.13	-0.55*	0.23
Education level				
Uneducated = Ref.				
Primary school			-0.37	0.27
Secondary school or above			0.03	0.54
Occupation				
Agricultural = Ref.				
No Agricultural			-0.41	0.28
Family structure				
Nuclear Family = Ref.				
Extended Family			0.02	0.2
Family economic status				
Low = Ref.				
Middle			-0.35	0.25
High			-0.65	0.39
Amount of agricultural land holdings			3.50E-07	0.00

Note: significant * $P \leq 0.05$; ** $P \leq 0.001$

Model 1 R^2 =0.4930 SSE = 512.49 df= 9 F = 20.75

Model 2 R^2 =0.7040 SSE = 284.64 df= 11 F = 38.54

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4.4 Discussion

Analysis results of factors affecting fertility of highland women in Kanchanaburi province are illustrated in Tables 4.24-4.28. It is found that important factors affecting fertility of women are population factors and intermediate variables while social and economic factors have only minor effect on cumulative fertility. The significant relationship between independent variables and fertility of highland women in Kanchanaburi province can be explained as follows.

Ethnicity: The analysis of factors affecting fertility of all highland women found that ethnicity has an effect on the difference in fertility in each ethnic group. When compare with Thai women while other variables are constant, Karen, Mon and Burmese women have the number of ever born children greater than Thai women. However, when adding social and economic factors into the analysis, it is found that Burmese and Mon women have no difference in the number of ever born children comparing to Thai women. This is potentially because Burmese and Mon people typically reside in the areas or communities nearby Thai people, which results in an adjustment to fit into Thai society and equally gain access to public health services. On the other hand, Karen people usually reside in the distance areas and do not regularly receive public health services (Isarabhakdi, 2004).

Age: Age has a positive relationship with fertility of all highland women when consider by ethnicity because this research applies the number of ever born children, which is cumulative fertility and consistent to previous studies whereby cumulative fertility will increase according to age of women.

Age at first marriage: Age at first marriage has an effect on the level of fertility of highland women in all ethnicities in which age at first marriage has a negative relationship with fertility, meaning that early marriage will extend the duration of potential pregnancy, resulting in an increase in fertility (Pramote Prasartkul, 2000).

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Education: The highest education level has an effect on fertility, especially of highland women and Thai women. Educated women will have fertility lower than uneducated women because being literate of Thai language will enable them to receive information and put reproductive health and family planning into practice within the family. Highly educated women want to raise their children at the best quality rather than focus on the number of children (Boonkong Hanjangsit, 2000; Phillip Guest, 1988). The study of Burmese, Mon and Karen women found no difference in fertility because these groups of women are mostly uneducated and the fertility behavior of highland women and Thai women has a negative relationship with education level and age at first marriage. Policy that aims at improving education will not only contribute to reduction in fertility, but also influence age at first marriage to become older (Matin, 1995).

Children death : The number of children death has a positive relationship with fertility of women from all ethnicities. When women have more children death, fertility will also become higher because the value of having extended family still exists in agricultural family. The majority of the families residing in the highland areas in this study (72.2 percent) work in the agricultural field. The agricultural families living in the distance areas often experience children death, resulting in higher potential of having more children as a security that the number of ever born children will meet their expectation. Moreover, children are also important labor for increasing agricultural productivity (Supreeya Suthamnuwat, 1982).

Contraception: Results show that variable relating to previous contraception usage has no effect on the level of fertility of Thai women and Mon women, but has a positive relationship with fertility of Burmese women and Karen women. Women who never have contraception have fertility lower than those who used to have contraception because knowledge toward contraception and service experience has recently begun to appear among highland people. As can be seen from the Seventh National Economic and Social Development Plan (1996) that the policy relating to family planning becomes highly important in order to reduce the number of population in the highland areas whereby women who used to have contraception may

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use contraception to discontinue pregnancy when the number of children responds to their demand, but not to be exempted from pregnancy period.

Moreover, population factors, social factors, and economic factors have no effect toward change in fertility of highland women in Kanchanaburi province, which can be explained as follows.

Marital Status: Marital status is not taken into account in the model because there is only minor difference in which the number of samples who are widowed, divorced, and separated is too small and can not be used in the analysis.

Occupation: When compare agricultural occupation and outside agricultural occupation, it is found that there is no difference in fertility of highland women. Even though previous research results found that agricultural occupation has fertility higher than other occupations (Institute for Population and Social Research, 2002; National Statistical Office, n.d.) because the characteristic of agricultural occupation are not contradicted to having children or child-raising duties, meaning that they can take children with them to work (Stycos and Robert, 1967). In this study, most occupations outside agricultural field of highland women are not contradicted to child-raising duties of the mother similarly to agricultural occupation, for examples, hired employee and merchant by having grocery at home or movable selling along the road or in the village where they can actually bring children with them. This results in no difference in fertility between women working the agricultural field and women working outside the agricultural field.

Family structure: Women living in the nuclear family or extended family do not contribute to difference in fertility of highland women in all ethnicities because duties and time used to look after their children are not the major problem for these groups of women residing in the rural areas and working mainly in the agricultural field, as previously discussed about the factor relating to occupation.

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Economic status: Economic status does not have the relationship with highland women in all ethnicities. It can be explained that these groups of women are still living in the real agricultural and rural society, not in the society where there is economic development, which influences people to value having quality children and want to reduce the size of the family. Furthermore, economic status is measured from permanent property within the family within taking quantity into account. Therefore, there is no difference in economic status regarding the quantity in relation to fertility.

Amount of agricultural land holdings: Previous studies found that amount of agricultural land holdings has a positive relationship with fertility, especially in agricultural society. People with large size of landownership will want to have more children (Supreeya Suthamnuwat, 1982). This research shows that amount of agricultural land holdings has no relationship with fertility in all women groups because in this study amount of agricultural land holdings is measured from agricultural land, which is privately owned, land rental, or using the land of relatives, or the land permitted by the government to undertake agricultural activities. In addition, the majority of privately-owned land has no ownership privilege such as title deed, which does not display amount of agricultural land holdings which indicates the real economic status as a security for lifetime stability similarly to previous research.

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CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The purpose of this research is to study the pattern and the level of fertility of women living in highland areas of Kanchanaburi Demographic Surveillance system, and to study the effect of demographic, social, and economic factors on fertility, which is measured by the number of children ever born. The factors consist of age, ethnicity, education level, marital status, occupation, economic status, and amount of agricultural land holdings. Intermediate variables of fertility consist of age at first marriage, number of children death, and contraception are also included in the model. It is expected that the results will be useful as a source of information and a guideline for promoting reproductive health of women living in Highland areas in the future.

Information from this research was obtained from the 4th round survey of the Kanchanaburi Demographic Surveillance System (KDSS), conducted in 2003, which was undertaken by Institute for Population and Social Research, Mahidol University. Data collection was done during July – August, 2003 whereby data collection was divided into 5 areas, including urban/semi-urban area, rice field area, crop plantation area, semi-agriculture and highland area. Three types of information were collected: community information; family information; and individual information. This research studies highland areas consisting of Amphur Sangklaburi, Amphur Tongphapoom and Amphur Srisawat since they are the distance areas and less developed as well as have ethnic diversity. Data analysis involved family information and personal information. Research samples were married women aged between 15 – 49 years old, with the total sample of 2,418 samples.

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Statistics used for data analysis consisted of percentage, frequency, mean, maximum-minimum value, and mode for general characteristics. The level and the pattern of fertility were calculated from age-specific fertility rate (ASFR) and total fertility rate (TFR). The analysis of factors affecting fertility was performed by multiple regression analysis at statistical significance level of $p < 0.05$.

5.1.1 The Pattern and the Level of Fertility

The patterns of fertility of all ethnicities are similar, which is downward J shape, indicating that the fertility will slightly increase at the beginning and will slowly decline until it reaches 0 at the end of reproductive age. Before ASFR equivalent to 0 during 35-39 years old, ASFR will be higher again but not as high as in the beginning. Thai women and Burmese women will have a declining ASFR and it will finish earlier than ASFR of Mon and Karen women.

Total Fertility Rate of all women is 3.44. When divide by ethnic group, total fertility rate of Karen women accounts for the highest, which is 4.80 followed by Burmese, Mon, and Thai women, which is 3.75, 3.19, and 3.00, respectively, which indicate that different ethnicities affect difference in fertility

5.1.2 Demographic, Social and Economic Characteristics

Sampling group consists of 1,452 Thai women, 190 Burmese women, 302 Mon women, and 475 Karen women, which is totaled to 2,418 samples. The majority is in the age group of 30-34 with an average age of 34 years old. Age at first marriage is found the most at aged 18. In addition, 93.0 percent of highland women are married and living with their husband. Family structure is a nuclear family. 2 out of 3 women work and earn income whereby all ethnicities work in agricultural field rather than outside agricultural field.

Almost half of highland women graduated at primary school level whereby Thai women are educated more than other ethnicities. Burmese, Mon, and Karen women, approximately 4 out of 5, are illiterate. In term of economic status, which is measured

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by the scores of permanent property within the family, it is found that almost half of Thai women have middle and high economic status but more than half of Burmese, Mon, and Karen women have poor economic status. In term of amount of agricultural land holdings, highland women in all three groups have similar amount of agricultural land holdings, which is approximately 30.0 *Rai*.

5.1.3 Fertility Behavior

Highland women used to have contraception contributing to 86.2 percent. The first birth control method used is contraceptive pills (55.9 percent). Currently, there is 79.2 percent of contraception among highland women, with the average number of pregnancies equivalent to 3 times, miscarriages and ever born children (2.75), infant mortality (0.21); and live birth (2.56), respectively.

94.1 percent of Thai women used to have contraception more than other ethnic groups, followed by Mon women (84.1 percent), Burmese women (74.7 percent), and Karen women (67.8 percent). The first birth control method used the most is contraceptive pills.

Thai women used to be pregnant approximately 2.4 times but Burmese. Mon women used to be pregnant approximately 3 times. Karen women used to be pregnant about 4 times. Women from all ethnicities have experienced miscarriage and infant mortality whereby the number of ever born children of Thai women is approximately 2 children, and Burmese, Mon, Karen women have the number of ever born children approximately 3-3.5 children.

5.1.4 The Relationship between Demographic, Social, and Economic Factors Affecting Fertility

The relationship between demographic, and economic factors affecting fertility, which is cumulative fertility measured by the number of children ever born, consisted of age, ethnicity, education level, occupation, family structure, marital status,

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economic status, and size of landownership, and intermediate variables of fertility included age at first marriage, infant mortality, stillbirth, and contraception indicated that:

Age has a positive relationship with fertility of highland women and women from all ethnicities.

Ethnicity has a relationship with fertility in which Mon and Karen ethnic groups have higher fertility comparing to Thai women.

Age at first marriage has a negative relationship with fertility of highland women and women from all ethnicities.

Number of children death has a positive relationship with fertility of highland women and women from all ethnicities.

Marital status is not taken into account because there are only a few examples.

Education level has a negative relationship with fertility whereby uneducated women will have children ever born less than educated women in Thai women and highland women.

Contraception still provides ambiguous results in relation to fertility of highland women and women from all ethnicities.

Social and economic factors that do not have any relationship with fertility of highland women and women from all ethnicities consist of occupation, family structure, economic status, and amount of agricultural land holdings.

5.2 Recommendations

1. Age at first marriage has an effect on fertility. Early marriage and having children at an early age may affect maternal health and infant mortality. As a result, people should be encouraged to get married at older age.

2. Number of infant mortality and stillbirth are important in explaining fertility of highland women. These groups of women should have knowledge on and receive maternal and child health services more widely in order to reduce infant mortality rate and as a result, affect the level of fertility.

3. Factors that affect fertility of highland women in Kanchanaburi DSS is similar to characteristic of natural fertility where demographic factors and intermediate

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variables will have important influence on change in the level of fertility of highland women whereas social and economic factors do not significantly have an influence. Further studies should focus on meanings and values of having children in each ethnicity.

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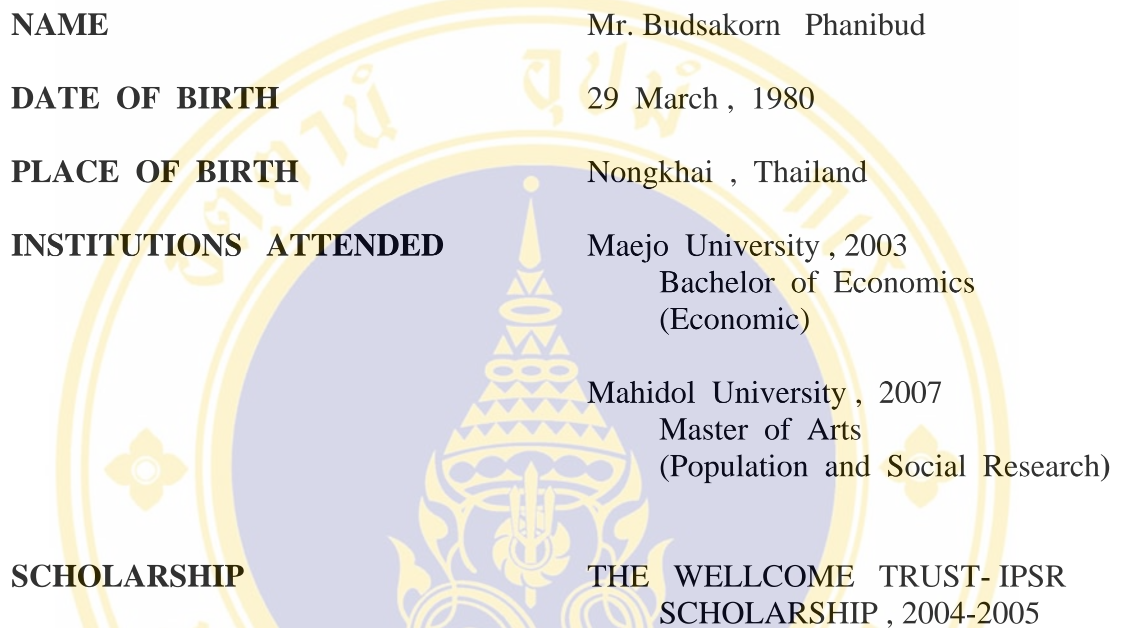

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