FERTILITY DECLINE IN WEST JAVA:
Analysis and Interpretation

by

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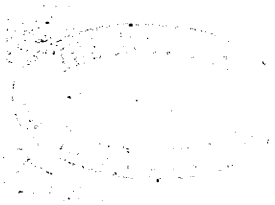

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DECLARATION

Except where otherwise indicated,
this thesis is my own work.

February, 1989 Uzair Suhaimi.

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A B S T R A C T

The aim of the study is to analyse and interpret fertility decline in West Java. While empirical data derived from various surveys and censuses are used for the analysis, the available literature supplements information for the interpretation. It is argued that the geographic setting and sociocultural environment of West Java explain the relatively high level of fertility for the province.

Consistent fertility decline and significant socioeconomic differentials in fertility have been found for West Java. Yet, fertility levels of the province have always been the highest among those of the provinces of Java and Bali. The study suggests that changes and differences in a number of intermediate variables (such as age at marriage and contraceptive practice) have been largely responsible for the observed phenomena.

Examination of the major components of the crude birth rate (CBR) indicates that age structure and the proportion of the population in childbearing ages have hindered the CBR decline. In contrast, marital status and marital fertility have been strongly conducive to the decline.

The study also suggests that fertility decline in West Java has occurred in the presence of significant improvement in socioeconomic development.

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CHAPTER ONE:
INTRODUCTION

This study analyzes and interprets fertility decline in the province of West Java, Indonesia. This province is interesting not only because it has the highest level of fertility among the provinces of Java and Bali, but also because it has different socioeconomic and sociocultural backgrounds from other provinces. Since the demographic profiles of the provinces of Java and Bali are similar to some extent, a brief comparative study of the provinces, the inner islands as a contrast to the outer islands of the country, is undertaken.

The analysis is based on secondary data derived from censuses and surveys, mainly the 1980 Population Census and the 1985 Intercensal Survey of the country. The available literature supplements the author's knowledge of the socieconomic and sociocultural contexts of demographic phenomena analyzed. Such contexts are of special interest in this study because they enrich our understanding of human fertility. The background materials are presented in this chapter.

1.1 Provincial Variation in Fertility: Overview

In most developing countries fertility remained constant until about 1965; but there have been significant declines in fertility since then (see, for example, Mauldin, 1981: 73). It was also about 1965 that fertility began to decline in Indonesia. Hull and Hatmadji (1988: 2) have noted that the total fertility rate (TFR) for Indonesia has fallen from 5.6 in the period 1967-70 to 3.3 in 1985 while over roughly the same period the TFR for China fell from 5.8 to 2.6 and Thailand's TFR from 6.6 to 3.4.

Knowledge about fertility levels and their trends for Indonesia is incomplete or even misleading if it does not consider the great variation among provinces. In Jakarta and West Nusa Tenggara, for example, during the period 1967-70 to 1985 the TFRs declined from 5.2 to 2.2 and from 6.7 to 5.6 respectively (Hull and Hatmadji, 1988: 19). Furthermore, it should be noted that fertility at the national level is highly biased toward levels found in the inner islands which have much lower levels of fertility than the outer islands. This is because about two-thirds of Indonesians are located in Java and Bali (Biro Pusat Statistik (BPS) [Central Bureau of Statistics], 1987b).

The great variation in fertility in Indonesia is not surprising if the geographical setting of the country is considered. As Hugo et al. (1987: 11) write, `Its [Indonesia's] people are distributed between more than 300 distinct ethnolinguistic groups and live in an archipelago of over 13 000 islands extending over some 40 degrees of longitude'. On the other hand if we are to believe that the family planning programme has been responsible for fertility decline in the country, the three different phases (five years apart) in the execution of the programme (National Family Planning Coordinating Board, 1986: 14) may provide some explanation of the current variation in fertility. A systematic study of fertility at the provincial level, of which there are very few, may be of interest for population policy planners in the country.

It is interesting to note further that even among provinces of the inner islands where the family planning programme started at the same time (in 1970), variations in fertility have been substantial. This is the main concern of the present study with its emphasis on West Java. Hull (personal communication) may be correct when he says that Jakarta and West Java would be better looked at simultaneously because there is `no social boundary'

between the two provinces. Furthermore, the social structure of both provinces, as Parsons (1984: 18) observed, is quite distinct from those of other provinces of Java. However, Hull's suggestion is not completely appropriate for the type of analysis proposed in this study as will become clear later.

1.2 Geographical Setting

This section briefly discusses the geographical setting of the study area, the province of West Java. This province is bordered by Central Java in the east and the Sunda Straits (Selat Sunda) in the west. The national capital of the country, Jakarta, is an enclave in the northern part of West Java while the Indian ocean is the southern border of the province. Because of its location next to West Java, Jakarta, as the centre of public administration, business and communication activities of the country greatly influences the socioeconomic activities of the people of the province (see Figure 1.1).

With an area about 46 300 square kilometres, West Java consists of 20 regencies and four municipalities (see Figure 1.2). The regencies of Serang, Tangerang, Bekasi, Karawang, Purwakarta, Indramayu and Cirebon are located in the lowlands of the coastal plain forming the northern part of the province. The southern part of the province, including the regencies of Sukabumi, Cianjur, Garut, Tasikmalaya and Ciamis, has a common steep coastal area running down to the Indian ocean.

The other regencies of the province are located in hilly (upland) areas, and probably for this reason the people of West Java used to be called orang gunung (mountain people) by the people inhabiting the lowlands (Stibbe, 1921 cited by Wessing, 1974: 23). Included in

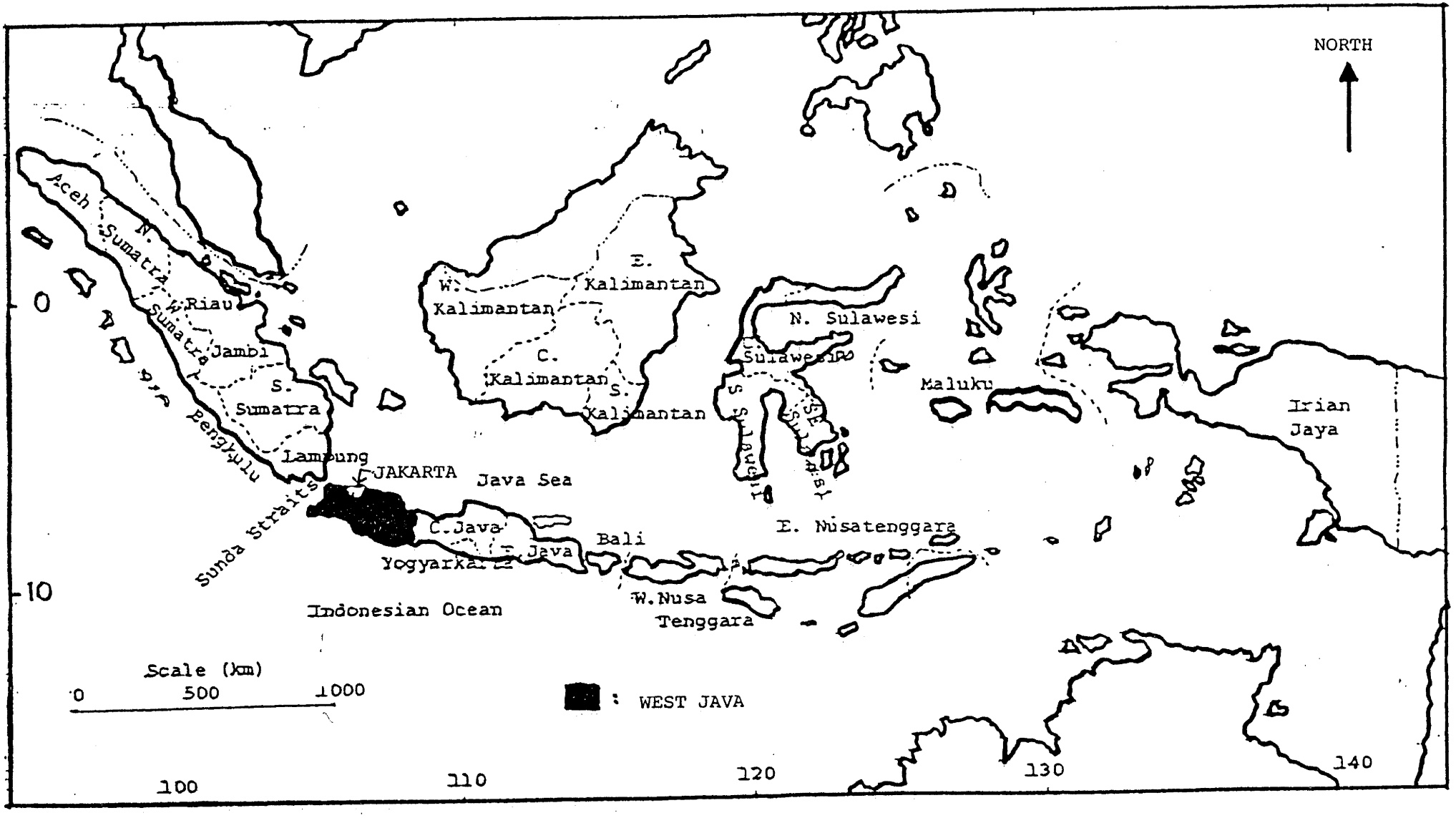

Figure 1.1: The Republic of Indonesia and Its Provinces

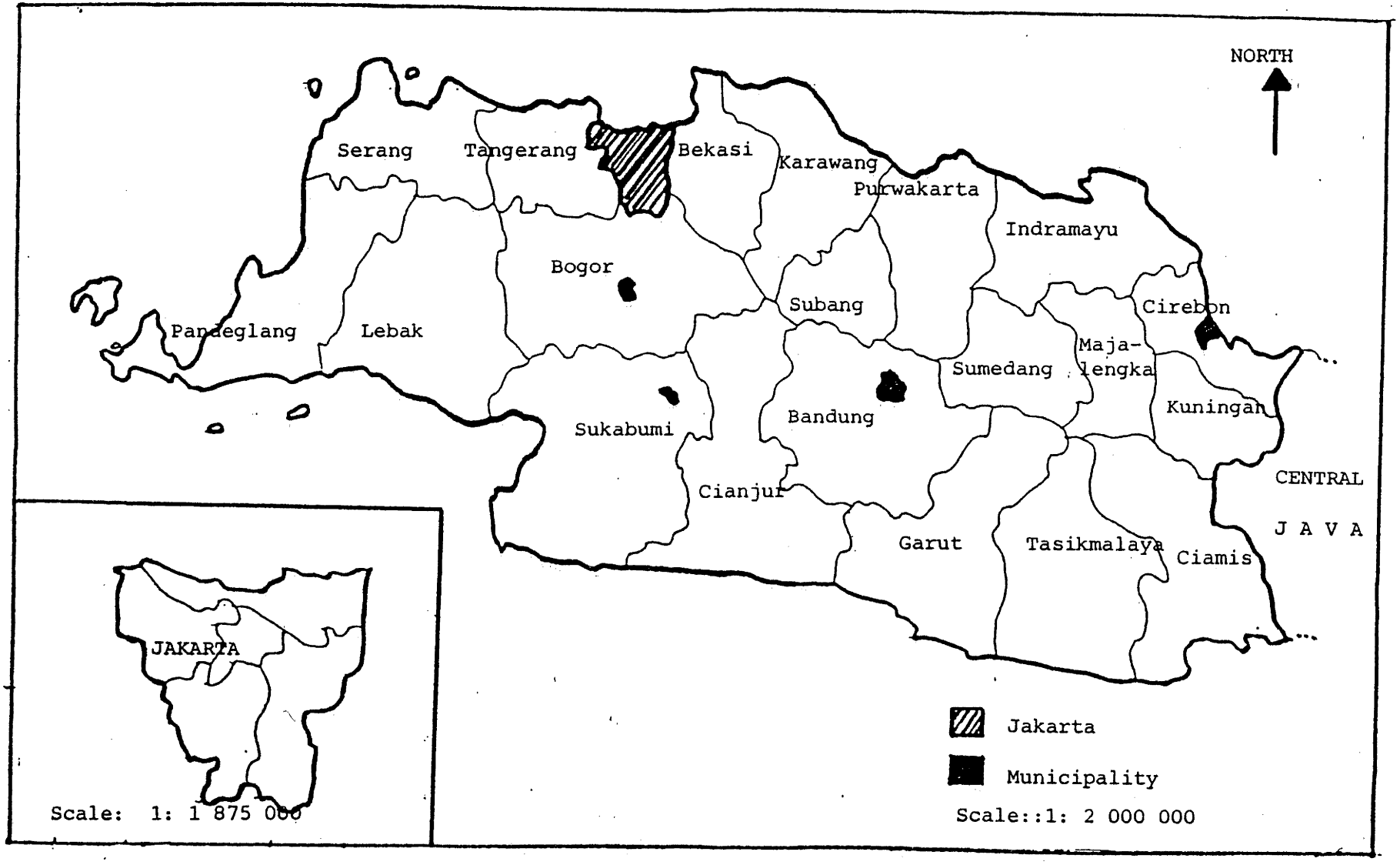

Figure 1.2: West Java and Its Regencies

this area are the regencies of Pandeglang, Lebak, Bogor, Subang, Bandung, Sumedang, Majalengka and Kuningan. All of these regencies, except the first two, are inland areas. Such a geographical setting, with the current state of communications, is claimed to be an obstacle to the success of various public services such as health and family planning services. If this is true, the relatively poor success of the family planning programme in West Java compared to other provinces in Java is understandable. For more detailed information about the geographic conditions of West Java see Rusli (1978: 21-26).

1.3 Demographic Characteristics

In terms of population, West Java is the second largest province in Indonesia after East Java. In 1985, the population of West Java was 30.8 million as compared with 31.3 million for East Java (BPS, 1987b).

The population of West Java almost doubled between 1961 and 1985 and its annual growth rate was very rapid compared to the national rate (see Table 1.1). The rapid growth was largely due to a high fertility rate, although this was counterbalanced by relatively high mortality. The influence of decline in the mortality rate on population growth is reflected in the increase in the annual population growth rate during the period 1961-1971 to 1971-1980.

A comparatively high infant mortality rate (Table 1.1) may provide some explanation of the relatively high rate of fertility in West Java. Here we would be dealing with a replacement effect (Preston, 1975, cited by Heer, 1983: 375). The relationship between infant mortality and fertility is, however, admitted to be complex (Heer, 1983; Williams, 1977). In addition, a case study by Darroch et al. (1981: 2) indicates few strong patterns emerge `between [infant or child] loss experience and

Table 1.1:
Some Basic Demographic Characteristics
of West Java and Indonesia

	West Java	Indonesia
Total Population (000)		
1961	17 615	97 086
1971	21 624	119 208
1980	27 454	147 496
1985	30 830	164 047
Annual Population Growth (%)		
1961-1971	2.1	2.1
1971-1980	2.7	2.3
1980-1985	2.3	2.1
Population Density (per Square Km)		
1961	380	15
1985	666	85
Age Structure		
Population Under 15 (%)		
1971	45.2	44.0
1985	40.1	38.8
Total Fertility Rate		
1967-1970	6.3	5.6
1981-1984	4.3	4.1
Infant Mortality Rate (per 1 000 births)		
Male		
1971	172	152
1985	100	117
Female		
1971	146	129
1985	82	64
Life Expectancy (Years)		
Male		
1971	42	45
1985	55	58
Female		
1971	45	48
1985	58	62

Source: BPS (1974b, 1975, 1983ac, 1987bd, 1988a)

perceived advantages or disadvantages of children' for parents in West and Central Java.

Net migration for West Java can be assumed to be negligible as a component of population growth. BPS (1988b: 9), for example, estimates the net migration rate for the province to have been only +0.7 per cent as compared to -6.9 per cent for Central Java and -2.8 per cent for East Java in the period 1980-1985. This comparison implicitly suggests a relatively low level of population mobility for West Java.

Another demographic characteristic of West Java is its age structure. Following Weeks' (1978: 160) categorization, the population of West Java should be considered a young population because the percentage aged below 15 is more than 35 (see Table 1.1). This is of course a typical feature of a high fertility population. Its implication for population growth in the near future is clear; the population will expand even if the fertility level is lowered.

1.4 Sociocultural Setting

To map out the sociocultural setting of any society is important for understanding its fertility behaviour. This is because, as Knodel et al. (1987: 143) write, `the impact of social and economic change on reproductive behaviour is mediated through the cultural setting'. For the majority of Indonesian societies, at least three elements should be mentioned in sociocultural descriptions. These are the Western, Islamic and ethnic traditions.

The first two are "horizontal" `because they run over all, or much, of the archipelago' (Palmier, 1965: 13). Nonetheless, their impact on the way of life of Indonesia is somewhat different in magnitude. The effect of the Western mode is relatively similar throughout the country because it is internalized through formal

schooling and other related institutions which are principally uniform. In contrast, the extent to which Islam influences the way of life of Indonesians seems to vary. Tan and Soeradji (1986: 31), for example, consider the Sundanese, the major ethnic group in West Java, to be `strict Moslems'. This is not to say that all Sundanese are strict Moslems since traces of pre-Islamic culture can also be found in the southern part of West Java. This culture, however, is reflected only in various ceremonial practices and is not manifested in the structure of the society.

The relevant questions to be answered immediately are how and why Islam is associated with fertility. Kirk (1966) probably answered the first question when he wrote that low age at marriage is more common in Moslem countries than elsewhere. In addition, resistance to family planning in Islamic society is more effective than in Catholic society (Kirk, 1966: 561). These mechanisms through which Moslem practices determine fertility may explain, to some extent, a comparatively high level of fertility for West Java.

One may argue, and this is a `more common view', that religion, including Islam, `is a kind of cultural impediment to rational reproductive behaviour, an impediment that will disappear in response to education and other sources of enlightenment' (Simons, 1980: 4). However, a more careful inquiry indicates that the issue is not that simple. Citing Parsons (1966), Simons (1980:3) writes:

> Cultural value patterns provide the most direct link between the social and cultural systems in legitimating the normative order of the society. The mode of legitimation in turn is grounded in religious orientation.

Here religion should be considered not merely as a variable in a conventional way but more importantly as the grounds for legitimation of a social norm. Knodel (1987: 143) has argued that `many cultural dimensions are

likely to show continuity and a fair degree of persistence even when social and economic change is rapid'. This clearly challenges the more common view mentioned before.

Simons (1980) believes that a fertility rite as found in Hutterite society is a religious representation of a sacred ideology. He shows that a conventional demographic explanation (age at marriage and mortality rate) does not work to justify the very high average family size of this society (over ten children). Rather he argues that `the sacred ideology designates a particular form of reproductive behaviour as sacred' (1980: 8), and `in substantial as well as structural respects, Moslem ideas about reproductive behaviour resemble Hutterite ideas' (1980: 10).

Turning finally to ethnic tradition, as mentioned before, the major ethnic group in West Java is the Sundanese. They are the second largest ethnic group in Indonesia after the Javanese who inhabit Central Java, Yogyakarta and East Java. Between the two ethnic groups there are many similarities. For example, `both groups have a bilateral kinship system and are predominantly Moslem' (Tan and Soeradji, 1986: 135), though their Moslems are widely believed to be different in degree of strictness. More importantly, because it may explain the fertility differential between these societies, there are some dissimilarities between the two ethnic groups.

Javanese society seems to be more hierarchical than Sundanese society. This may be explained by, among other things, the existence of many big kingdoms in the past which ruled over the Javanese. The hierarchical society is expressed by what Parsons called `the Javanese view of authority'; that is, authority figures `have traditionally been viewed by the rakyat or common folk with a mystical reverence' (Parsons, 1984: 5). The practical consequence of this is that this Javanese tradition and view of authority

> ...can help gain acceptance for family planning even in a socioeconomic situation which is not particularly conducive to an individual recognition of the value of fertility limitation.... This is why, in part, the greatest achievements of the programme have been experienced in East and Central Java and perhaps a factor accounting for the relative lack of programme success in West Java which is predominantly Sundanese in ethnicity and social structure (Parsons, 1984: 13).

In contrast to the Javanese, the Sundanese seem to be more egalitarian and democratic. Although in the past a few kingdoms have also ruled over the Sundanese

> ...there is no evidence indicating the existence of the social division into castes as found in Hindu society. Neither is there evidence showing that among the Sundanese there had ever been a strong and rooted feudal bureaucracy, nor showing the existence of the palace which became the centre of cultural and social life for the people (translated from Rosidi, 1980: 132).

The egalitarianism found among the Sundanese may be favourable to fertility decline in the long run. However, in the current stage where adoption of family planning is much more the result of external influences (the government) than of individual motivation as implicitly stated by Warwick (1986: 453), the egalitarianism is not having an effect.

Another feature of the Sundanese which seems to differentiate them from the Javanese is the lack of solidarity among them. Wessing (1974: 147) has concisely explained this by saying:

> ... peer group, in the sense of solidarity between equals, is not really applicable to the Sundanese. The group of lower status people may be large, but solidarity can not really be said to exist among them. On the other hand, the higher one rises in status the fewer `peers' one has, but even among those few no solidarity can be said to exist.

The lack of solidarity is likely a reflection of the absence of the Javanese view of authority, with the

practical consequences for the family planning programme mentioned before.

The sociocultural setting of the Sundanese in contrast to the Javanese has been mapped out. The setting of the Balinese, another society which is also included in the analysis, is well-documented. While the Sundanese and the Javanese are mainly Moslems, the Balinese are predominantly Hindu. More importantly, the Balinese have a distinctive social organization known as the banjar, a small community made up primarily of kin-related family which is equivalent in size but different in function to the hamlet in Java (Parsons, 1984: 7). Through this organization, family planning among the Balinese has been very successful (Streatfield, 1987), though `there are significant variations in population growth patterns and contraceptive use in different regions of Bali' (Poffenberger, 1983: 59).

1.5 Objectives and Outline of the Study

The major concerns of the study can be stated in the following two questions: (1) why has the fertility level in West Java not remained constant, and (2) why has the level been comparatively high? A reasonable comparative context for answering the second question is provided by Java and Bali.

While the previous sections may indicate broad answers to these questions, more specific and detailed explanations are required. It should be demonstrated, first, that the fertility level in West Java is comparatively high; otherwise the second question is misplaced. In Chapter Two, this is accomplished by applying measures of both current and cohort fertility. The past trends in fertility of the province are also shown and compared with those of other provinces of Java and Bali. Also in Chapter Two, fertility differentials according to some well-known fertility determinants are briefly discussed. This time, due to lack of appropriate

data, the comparison with other provinces is not given, but a comparison between different birth cohorts is included.

In Chapter Three, the change in crude birth rate (CBR) and in its major components is evaluated. The influence of change in CBR components on change in the CBR in West Java is examined and compared with that of other provinces.

Acknowledging the important association between socioeconomic variables and fertility and accepting the complexity of the issue, in Chapter Four the socioeconomic context of fertility decline in West Java is explored. This exercise is undertaken largely to evaluate an argument that fertility decline in Indonesia has occurred in the absence of significant improvement in socioeconomic development. In Chapter Five, the last chapter, the major findings of the study are summarized. Recommendations for further study are also presented in this chapter.

1.6 Data and Methodology

The analysis is based on secondary data various censuses and surveys though there are only two which are extensively used - the 1980 Population Census (the 1980 census) and the 1985 Intercensal Survey (the 1985 survey). This section discusses only these two major sources. Details for other sources used can be found in McNicoll and Singarimbun (1983, Appendix).

The 1980 census consisted of a complete enumeration in September-October 1980 and a more detailed sample enumeration, with a much longer questionnaire, in October 1980. The sampling fraction was five per cent (Poedjastoeti, 1983). The data used here are from the sample enumeration.

The 1985 survey was a sample survey and was conducted in October-November 1985. Unlike the 1980 census, the sampling fraction of the survey varied widely from province to province, and was based on the population density of each province. As examples, the sampling fraction for West Java was 0.3 per cent (urban) and 0.3 per cent (rural), while for Bali the percentages were 1.3 per cent (urban) and 0.5 per cent (rural) (BPS, 1986b: 18). For the type of analysis proposed, the size of data sets is not a problem. However, the sampling design of the survey does not allow any demographic parameters to be eatimated at regency level or below (BPS, 1986b: 11-18). Mainly for this reason, this study does not analyze regency level variation in the fertility of West Java, though the variation has been quite substantial (see Cho et al.,1980: 61).

There is no coverage problem in the 1980 census and the 1985 survey; both were designed to cover all households in Indonesia. There are also no problems in the quality of interviewers or in the level of supervision in either the census or the survey (see, for example, Hull and Dasvarma, 1987). These assertions all suggest, at first glance, that the 1980 census and the 1985 survey data can safely be compared. However, a more careful examination suggests that comparison problems do still exist.

The accuracy of the data seems to be different in the two sources as a result of different sample sizes (larger for the 1980 census) and different methods of asking questions for some variables. For example, while in the 1980 census there were three related questions about age, in the 1985 survey there was only one. Another important example is the way of asking about the last birth. Regarding this event the 1980 census had only two questions as compared to 23 related questions in the 1985 survey.

Probably the most serious problem that should be considered in using these sources is the accuracy of age data. The U.N. Age-Sex Accuracy Index for West Java was 48.1 for the 1980 census and 51.6 for the 1985 survey (Larson, 1987:9). These figures indicate how unreliable the data are. However, it is not proposed to adjust the data since any effort to do so will obviously affect related measures (mostly cross-classified by age) used in this study. Inspection of other sources of data used indicates that the problem of accuracy in age data is even worse. Given this limitation, the results of analysis in this study should be treated as tentative.

The type of analysis undertaken is basically descriptive, through tabulations. To examine the relative influence of age structure, marital fertility and the other major components of the crude birth rate (CBR) on change in the CBR, the standardization approach developed by the U.N.Secretariat (1979) is employed. A summary of the method is given in Appendix One of this study.

One may argue that Bongaarts' model (1978) may be used for a similar purpose; that is `to estimate the relative importance of each of the four variables of which it [the TFR] is constituted' (Handwerker, 1986: 8). Mainly because there are not sufficient data available for such an analysis, this model is not employed in this study. Furthermore, as Handwerker (1986: 8-9) writes,

> ...the model limits itself to proximate fertility determinants, one of which, proportion of married women, is a proxy for more immediate determinants of the frequency of coitus relative to ovulation, including age at marriage, polygamous status, women's work loads, the mean duration of spousal separations, and the relationship between separations and fecundability, age differentials between marital partners, and divorce, mortality, and remarriage rates. Finally,...the model begs the broader questions of the determinants of intermediate variable parameters.

CHAPTER TWO:
TRENDS AND DIFFERENTIALS IN FERTILITY

Although fertility, especially in developing countries, is a complex phenomenon (Wrong, 1964: 42; Bulatao, 1983: 1), at least two aspects of this phenomenon have been broadly understood. These are that fertility in developing countries has declined since the mid-1960s and that the pattern of the decline has varied across the strata of societies (see U.N., 1978). Variation in this very general picture is sometimes substantial. For this reason, a study of such issues is still of interest for both policy makers and researchers. This chapter provides a descriptive analysis of trends and differentials in fertility in West Java.

2.1 Trends in Fertility

Fertility levels can be described in terms either of current or period fertility, or of cumulative or cohort fertility. While period fertility refers to childbearing during a specified time, cohort fertility refers to childbearing of the individual or a group during her/its reproductive span.

Period fertility is needed in assessing time trends and in relating fertility change to other time-dependent indices such as measures of economic growth. Cohort fertility, on the other hand, is useful to understand how individual demographic experience is influenced by immediate surroundings (Cho et al, 1980: 29-30). As will be seen soon, both approaches suggest that the fertility level in West Java has declined considerably of late.

2.1.1 Average Parity

Fertility decline in West Java can be shown by, among other things, the 1980 census and the 1985 survey data. The two sources permit paired comparisons of average parity, in this case the mean number of children ever born per woman, for adjacent five-year birth cohorts. The comparisons are presented in Table 2.1.

Table 2.1 Mean Number of Children Ever Born Per Woman in West Java by Birth Cohort and Age Group, 1980 and 1985

Birth Cohort	Age Group (years)							
	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54
1925-30								5.57
1930-35							5.93	5.07
1935-40						5.76	5.04	
1940-45					5.32	5.08		
1945-50				4.25	4.45			
1950-55			2.86	3.47				
1955-60		1.46	2.39					
1960-65	0.28	1.11						
1965-70	0.16							

Source: Calculated from BPS (1983c, 1987d).
Note : The upper diagonal is the 1980 census data, the lower, the 1985 survey.

The figures in the table do give a strong indication of a fertility decline experienced by successive birth cohorts of younger women. However, they may overstate the extent of the decline. For birth cohorts 1940-45 and older mean numbers of children ever born reported in the 1985 survey are lower than those reported at the 1980 census. This is a logical impossibility which suggests

that 1985 figures may be systematicaly biased downward compared to 1980 ones for all birth cohorts.

Table 2.1 also shows that, based on the 1980 data, average parity was lower for age group 50-54 than for age group 45-49. A conventional explanation for this is memory lapse; that is, older women tend to forget the total number of children they have borne. It is, however, conceivable that 'older women actually experienced smaller numbers of children ever born than younger women' because of 'higher mortality and morbidity during their reproductive period' (Cho et al, 1980: 33), even though 'the effects of mortality on average parity are likely to be very small' (U.N., 1983: 29).

In general it can be said that average parity is not reliable as an estimate of fertility level because of errors in either the number of children reported or errors in the classification of women in particular groups. The most important source of the former errors, as mentioned before, is omission. This omission has the result that 'the proportion of omitted tends to increase with age of mother', and accordingly 'average parities...fail to increase rapidly enough as age increases' (U.N., 1983: 28). Errors in the classification of women are very likely substantial for West Java given the very poor quality of age data.

A few attempts to estimate the TFR completely based on parity have been made. Coale and Demeney (1967, cited in Brass, 1980: 35) have shown from empirical study that the TFR may be approximated as:

$$TFR = (P_3)^2/(P_2)$$

Another formula has been proposed by Brass (1980: 35), based on Gompertz's equation as follows:

$$TFR = P_2 \ (P_4/P_3)^4$$

where P2 denotes the mean number of children to the cohort of women in age group 20-24, P3 the number to women aged 25-29, etc.

Applying these formulae to the data for West Java provides the following figures for the TFR in 1980 and 1985 : 5.6 and 5.2 (Coale and Demeney's formula), and 7.9 and 4.9 (Brass' formula). These big differences suggest that both formulae can not be applied confidently to the data for West Java probably because of poor quality of the data

For an immediate comparison between geographic areas, the mean parity per woman aged 45-49 can probably be used. Using this measure fertility for West Java was higher than that for any other province of Java and Bali, as Table 2.2 shows.

Table 2.2: Mean Parity per Woman Aged 45-49 for Provinces of Java and Bali, 1980 and 1985

Province	1980	1985
West Java	5.9	5.0
Jakarta	5.4	4.6
Central Java	5.2	4.9
Yogyakarta	4.9	4.5
East Java	4.5	4.1
Bali	4.9	4.5

Source: Calculated from BPS (1983b-g, 1987c-h)

2.1.2 Age Specific and Total Fertility

The total fertility rate (TFR) is a period measure. It is defined as the number of births that a woman would have if she experienced a given set of age-specific fertility rates throughout her reproductive span. In this definition mortality is assumed to be nil until the end of the childbearing period (Shryock, Siegel and associates, 1980: 523).

The TFR can be estimated by various methods. Two of these are the Own Children and the Last Birth methods, on which the TFR figures reported here (and also the crude birth rate figures discussed in the next chapter) are based. The Own Children method is quite widely applied to data for several ESCAP countries (Ogawa, 1980: 65). It calls for a reasonably accurate age classification and relatively low mortality during the estimation period prior to enumeration. Although these requirements 'can be flexible to a certain extent' (Ogawa, 1980: 79), failure to meet them may seriously affect the accuracy of the results.

The Last Birth method, on the other hand, is relatively free of the various assumptions, some of which are unrealistic for Indonesia, which usually underlie indirect methods of estimating fertility (Hull and Dasvarma, 1987: 1). Unfortunately, this method also has possibly serious limitations when applied to data of poor quality like Indonesia has (see Appendix Two). For these reasons one should be extra cautious in interpreting fertility levels in this thesis.

Table 2.3 presents age-specific and total fertility rates for West Java. Note that while the last two columns of the table are based on the Last Birth method, the other columns are calculated using the Own Children method as reported by BPS (1988a). Because of this difference and in order to achieve a fair comparison, the figures in the last two columns should be treated separately. However, Table 2.3 overall still clearly shows the continuing fertility decline in West Java in the period 1967-1985.

Table 2.3: Age Specific Fertility Rates (ASFR) and Total Fertility Rates (TFR), West Java, 1967-1985

Age Group	1967-70	1971-75	1976-79	1981-84	1980	1985
	(1)	(2)	(3)	(4)	(5)	(6)
15-19	208	164	157	120	119	70
20-24	305	285	264	224	236	179
25-29	280	271	237	206	209	170
30-34	211	211	185	155	161	138
35-39	199	119	109	100	108	73
40-44	50	59	49	44	45	30
45-49	14	19	13	12	14	9
TFR (per thousand)	6335	5640	5070	4305	4465	3340

Source : BPS (1988), Hull (personal communication).
Note : Except for the last two columns which are the results of the Last Birth method, the figures are calculated applying the Own Children method.

A brief inspection of the age-specific fertility shown by the table indicates that fertility has declined at all ages almost without exception throughout the observed period. The most striking decline is shown in age group 15-19. This very likely is associated with upward movement in female ages at first marriage. Comparing closely the age-specific fertility rates (ASFRs) for provinces of Java and Bali indicates the existence of a very similar pattern throughout the region (BPS, 1988a).

Changes in ASFRs are normally reflected in changes in the mean age of childbearing. The mean age, in turn, influences future fertility performance, at least hypothetically. According to Yaukey (1973) there are three paths by which rise in the mean age (this means delaying the timing of births) could reduce period fertility without reducing cohort completed fertility. These paths are:

> ...by lengthening the time it takes newborn daughters to become mothers, by allowing more chance for mortality to deplete cohorts before they complete their childbearing, and by temporarily depleting the number of births during the period of transition from early childbearing to late childbearing (Yaukey, 1973: 12)

Table 2.4 illustrates how the mean age of childbearing for Java and Bali has been constant or has even decreased (except for Jakarta) during the observed period. This probably has happened because a sharp decline in fertility for the younger age group, 15-19, which tends to increase the mean age of childbearing has been counterbalanced by quite substantial declines in fertility for older age groups (25-29 to 35-39) that tend to depress the mean age. The TFRs for West Java, as Table 2.4 shows (figures in parentheses), are highest.

Table 2.4: Mean Age of Childbearing in Java and Bali by Province, 1967-70 and 1981-84

Province	1967-70	1981-84
West Java	27.4 (6.3)	27.4 (4.3)
Jakarta	27.2 (5.2)	27.4 (3.2)
Central Java	27.2 (5.3)	27.2 (3.8)
Yogyakarta	28.2 (4.8)	27.9 (2.9)
East Java	27.0 (4.7)	26.5 (3.2)
Bali	27.8 (6.0)	27.2 (3.1)

Source: Calculated from BPS (1988a).
Note : Figures in parentheses indicate the TFRs.

2.1.3 Standardized Fertility

Comparing fertility levels is more appropriately accomplished using standardized fertility measures such as Coale's indices. In the indices system, an index of overall fertility (If) is factored into an index of marital fertility (Ig) and an index of proportion married (Im). Ig reflects the actual range of fertility variation

from zero to one. If Ig=0 it means zero fertility while a value of 1 means natural fertility as observed among the Hutterites of North America. Im also ranges from 0 to 1 and reflects the fertility impact of the proportion married at different ages. Ignoring illegitimate fertility, If = Ig x Im and therefore also ranges from 0 to 1 (see Coale, 1965).

Indexes of overall (If) and marital (Ig) fertility for West Java in comparison with those of other provinces of Java and Bali are presented in Table 2.5. It can be seen from the table that the level of overall fertility (If) for West Java is at all dates the highest. However, as in other provinces it has declined considerably over the observed period.

Marital fertility (Ig) more accurately expresses fertility where most fertility takes place within marriage because it controls for the age-specific proportion married. Marital fertility reflects couples' contraceptive use (including abortion) and their desires for children within marriage (Thapa et al.,1988: 12). Table 2.5 shows that the level of marital fertility for West Java in 1971 was two-thirds of natural fertility and slightly lower than that for Bali (note that in that year the family planning programme was not yet officially operating in Indonesia). The table also demonstrates that as in other provinces of Java and Bali, marital fertility has sharply decreased in the observed period.

Hiroshima (1986) has mathematically proved that decline in marital fertility does not necessarily mean decline in fertility of couples. Whether or not it is true for Indonesia, calls for further investigation.

The fertility-weighted index of the proportion married (Im) in West Java in 1971 was 0.79 and in 1985 was 0.76, quite high figures. For comparison, (Im) for

Bali at the same dates were 0.70 and 0.66. It is worthwhile to note that the pattern of differences in

Table 2.5: Indices of Overall Fertility (If), Marital Fertility(Ig) and Proportion Married (Im) for Java and Bali by Provinces, 1971, 1980 and 1985

Province	If			Ig			Im		
	1971	1980	1985	1971	1980	1985	1971	1980	1985
West Java	.53	.37	.28	.67	.48	.37	.79	.77	.76
Jakarta	.44	.33	.17	.64	.52	.29	.69	.63	.59
Central Java	.44	.34	.25	.58	.46	.36	.76	.73	.69
Yogyakarta	.38	.28	.20	.57	.45	.33	.67	.62	.61
East Java	.39	.28	.22	.52	.37	.30	.75	.76	.73
Bali	.49	.29	.21	.70	.42	.32	.70	.69	.66

Source: Hull and Dasvarma (1987, Table 2).
Note : (Im) is calculated by dividing (If) by corresponding (Ig).

the proportion married does not correspond to that of differences in marital fertility. Rather the relationship seems to be an inverse one with differentials in proportion married 'offsetting those of marital fertility and hence narrowing the range of variation in overall fertility' (Cho et al., 1980: 43).

2.2 Some Explanations of the Decline and the Variation in Fertility

From the previous discussion two things are clear: (1) the fertility level in West Java has declined, and (2) the level has been the highest among the provinces of Java and Bali. These phenomena call for explanation.

Following Davis and Blake's framework (1956), the rise in age at marriage and the increase in contraceptive

prevalence in West Java have certainly been favourable for fertility decline in the province. The former is believed to be associated with the expansion in educational participation by younger birth cohorts, while the latter is a result of easier access to "modern" contraception. On the other hand, the fact that West Java has the lowest age at marriage and the lowest contraceptive prevalence might explain, to an extent, its relatively high fertility level compared with the Java-Bali standard.

Breastfeeding and associated postpartum abstinence which are major determinants of overall fertility in Java and Bali 'are probably important in determining regional and socioeconomic fertility differentials' (McNicoll and Singarimbun, 1983: 60). Unfortunately, there has been some decline in the mean duration of breastfeeding and of postpartum abstinence (see, for example, McNicoll and Singarimbun, 1983: 60). Following Rosa (1979: 13), this condition is associated with 'modernization' or 'pseudomodernization' and is certainly unfavourable for fertility decline. McNicoll and Singarimbun (1983:60) write that the decline in the duration of postpartum abstinence among the Javanese is associated with 'the rapidly expanding use of "modern" program-supplied contraceptive techniques' and with 'the erosion of taboos' against resumption of intercourse during breastfeeding.

In 1976, the mean duration of breastfeeding for West Java was 16.1 months, a shorter duration by 1-2 months than in other provinces of Java and Bali aside from Jakarta (Indonesian Fertility Survey, 1978: 49). Breastfeeding 'protects against pregnancy mainly because it delays the return of ovulation during the postpartum period' (Nag, 1980: 8). This is, however, 'largely a function of intensity of breastfeeding' (McNicoll and Singarimbun, 1983: 60).

Probably because postpartum abstinence is too sensitive an issue, survey data on the subject 'are not helpful' and

therefore 'we must rely on intensive village studies' (McNicoll and Singarimbun, 1983: 56). Citing Zuidberg (1978) and Singarimbun and Manning (1974), McNicoll and Singarimbun (1983: 59) write that the duration of postpartum abstinence for women in Serpong, a district in West Java, was shorter than for women in Mojolama, a village in Yogyakarta. In addition, according to Zuidberg, there was 'no taboo against resumption of intercourse prior to weaning' for the observed women in Serpong. The influence of Islam is seen here. As Hull et al. (1977: 34) write, the duration of postpartum abstinence among the Sundanese 'apparently conforms fairly closely to the perfunctory 40 days prescribed by the Holy Qur'an with the result that birth intervals are shorter than among the ethnic Javanese'.

2.3 Differentials in Fertility

Age at marriage, as already mentioned, is one variable that explains the decline and the variation in fertility in Java and Bali. This section evaluates how this variable affected fertility in West Java in 1980. It is well documented that fertility performance varies if cross-classified by socioeconomic variables. This section also evaluates how women's education and landholding area are associated with fertility in West Java using special tabulations from the 1980 census.

The measure of fertility used is the mean children ever born to ever married women. To control for the effect of age on this measure and in order to give a time perspective to the analysis, attention is given to different age groups or birth cohorts of women.

2.3.1 Age at Marriage and Fertility

Age at marriage is expected to be associated with fertility. However, the mechanisms linking these variables, in aggregate and at individual levels of analysis, are not always clear. In addition, the direction of the causal influence is frequently elusive. For example, while it is widely believed that age at marriage influences fertility (U.N., 1987), Smith (1983: 479) writes that it is often argued 'at least implicitly, that the marriage timing is guided by fertility intention'.

Whatever the reasons and mechanisms are, the 1980 census data indicate a strong and negative relationship between age at marriage and fertility in West Java (Table 2.6). This is true for all cohorts, but the pattern of the relationship cannot be compared across birth cohorts because of different periods of exposure to the risk of marital childbearing.

A tendency to delay marriage for more recent birth cohorts of women is also seen in the table. This is evidenced by decreases in the percentage of women who married at early ages. Putting this in another way, the median ages at marriage for birth cohorts 1931-1935 and 1951-1955, for example, were 14.9 and 15.6 respectively.

There are at least two possible ways through which age at marriage affects fertility. It can directly affect cumulative fertility by limiting the number of years available for childbearing. On the other hand, age at marriage may indirectly affect fertility because delayed marriage 'may allow women the opportunity to develop career or personal interests which compete with the childbearing role when they do get married' and thus 'enhance the motivation for family planning after marriage' (U.N., 1987: 90).

Table 2.6: Mean Parity of Ever Married Women by Age at Marriage for Selected Birth Cohorts of Women, West Java, 1980

Age at Marriage	Birth Cohort 1931-1935	1936-1940	1941-1945	1946-1950	1951-1955
<14	6.6(14.9)	6.3(15.0)	6.1(14.3)	5.0(15.0)	3.8(13.0)
14-15	6.0(36.6)	5.9(35.3)	5.6(34.9)	4.6(34.0)	3.3(29.2)
16-17	6.0(24.6)	5.9(24.4)	5.4(25.9)	4.3(25.3)	3.0(27.4)
18-19	6.0(10.8)	5.8(12.1)	5.2(12.8)	4.1(12.9)	2.7(15.4)
20-21	5.4(6.9)	5.0(7.6)	4.7(6.5)	3.4(6.7)	2.1(8.0)
22-24	5.6(2.6)	5.1(2.8)	4.2(3.0)	3.0(3.5)	1.5(5.0)
25+	4.2(3.6)	4.0(2.8)	3.3(2.6)	1.8(2.6)	0.8(2.0)
Total	6.0	5.8	5.4	4.3	3.0
(N)	(532 935)	(670 786)	(798 425)	(750 275)	(1020 989)

Source: Special tabulation of the 1980 census (unpublished)
Note : Figures in parentheses represent the percentage of ever married women.

At a societal level, the socioeconomic characteristics of populations with later age at marriage are more likely to be associated with higher contraceptive use. They tend to be more educated and more urbanized. Their lower fertility is therefore 'not only because of their lost reproductive years but because of deliberate limitation of marital fertility' (U.N., 1987: 90). Such relations, to some extent, are also found in West Java as Table 2.7 shows.

Another issue concerning the relationship between age at marriage and fertility which is worthwhile mentioning here is that 'women who marry at older ages have a shorter first birth interval than those who marry at younger ages' (U.N., 1987: 92). This was true for Java and Bali in 1976, the only exception being for those who

Table 2.7: Percentage of Ever Married Women who Completed Primary School, Lived in Urban Areas and Ever Used Any Contraceptive Method by Age at Marriage, West Java, 1980.

	Age at marriage:		
	Below 14	18-19	25 or above
Completed Primary School or above	1.4	19.8	22.1
Living in Urban Area	16.7	24.2	33.6
Ever Used Any Contraceptive Method	18.8	31.6	30.4

Source: Special tabulation of the 1980 census (unpublished)

married at ages 25 or above (Adioetomo, 1981: Tables 5.1-5.4). In effect, fertility rates during the first few years of marriage are higher for women who married at older ages than for women who married at younger ages (U.N., 1987: 92). Nonetheless, the long run effect of age at marriage on fertility should be reflected in the mean number of children ever born to women who have nearly completed childbearing (U.N., 1987: 95). Table 2.6 clearly shows that for the birth cohort 1931-1935, aged 45-49 at the time of observation, the negative effect is quite powerful.

2.3.2 Education and Fertility

Like age at marriage, education is also expected to be related to fertility. The hypothesized relation between them, according to Mason et al. (1971, cited in Cochrane, 1979: 3) is that 'The higher the educational level of the husband and wife the lower the fertility'. There is 'overwhelming empirical evidence for this hypothesis'. The relation is certainly indirect, operating through factors such as desired family size, contraceptive knowledge and age at marriage (Cochrane,

Table 2.8: Mean Number of Children Ever Born to Ever Married Women by Educational Level and Birth Cohort of Women, West Java, 1980

Educational Level Completed	Birth Cohort < 1946	1946-55	> 1955
	Unstandardized		
No Schooling	5.3 (61.5)	3.7 (25.5)	1.3 (19.1)
Some ES	5.8 (26.1)	3.7 (39.2)	1.3 (44.4)
ES	5.7 (9.3)	3.4 (26.7)	1.2 (30.8)
JHS or above	5.5 (3.1)	2.8 (8.6)	1.2 (5.6)
Total	5.5	3.5	1.3
(N)	(3 544 296)	(1 808 787)	(1 826 375)
	Standardized by Age at Marriage		
No Schooling	5.4	3.6	1.3
Some ES	5.8	3.6	1.3
ES	5.8	3.4	1.3
JHS or above	6.3	3.9	1.6
Total	5.6	3.6	1.3

Source: Calculated from special tabulation of the 1980 census (unpublished).

Note : (1) All birth cohorts included 'not stated' birth cohort.
(2) Numbers in parentheses represent percentage of ever married women.
(3) Total for the first panel included 'not stated' educational level
(4) ES: Elementary School; JHS: Junior High School
(5) Distribution of age at marriage used in the standardization is as presented in Table 2.6 (see text).

1979: 5; U.N., 1987: 214). For West Java, the relationship is quite strong as shown by Table 2.8, but is not always linear as hypothesized above. The cohorts shown in the Table 2.8 are not the same as for Tables 2.6 and 2.10 because the source tabulation did not contain enough detail.

Table 2.8 shows that unstandardized and standardized patterns of the relationship are quite different. These differences probably indicate the strong joint effect of

education and age at marriage on fertility. Comparison among different birth cohorts also indicates quite different patterns of the relationship. However, the patterns are not comparable because of differential exposure to risk of marital childbearing among birth cohorts.

Table 2.8 also shows that mean parity for the oldest cohort of women with no schooling is relatively low. Among other possible explanations, this is probably because these women reported parity poorly (assuming the quality of the data is not uniform across education groups).

Another important issue regarding the relationship between education and fertility is that breastfeeding, abstinence and mortality effects 'act to increase the supply of children, raising the possibility that the net effect of education' on fertility 'may not always be negative' (U.N., 1987: 215). It is well documented that shorter duration of breastfeeding and postpartum abstinence practices (tend to increase fertility) and lower infant mortality (tends to decrease fertility) are more likely to be found among well educated than less educated women. However, there is no sufficient evidence for these processes being active in West Java.

2.3.3 Socioeconomic Status and Fertility.

The relation between socioeconomic status and fertility seems not to be uniform and probably varies according to cultural context and level of development of a society. Rainwater (1960: 2), using data from America, finds a negative correlation between socioeconomic status and fertility. In a stronger statement, Wrong (1967: 71) writes that 'the existence of a negative correlation between fertility and class or socioeconomic status has virtually acquired the force of a sociodemographic law'.

This 'law', however, does not get support from various empirical studies. A classic study by Stys (1957) using data

from Poland, for example, indicates a positive correlation between the holding size of farms and fertility, and the regularity 'is marked and applied in all twenty villages in the sample' (1957: 136). Data from Indonesia provide similar findings (Hull, 1976; Supraptilah and Soeradji, 1979). While Hull (1976) uses the data from a case study in rural Java as the basis of her study, Supraptilah and Soeradji use aggregate data for the whole country. Yet both studies use a similar composite index for the socioeconomic status of households (incorporating educational level of the mother or the head of household, household possessions, income, etc.).

Using a single indicator, that is land holdings that are owned by households, 1980 census data indicate the existence of the positive relation between socioeconomic status and fertility in West Java. Table 2.9 shows that the positive correlation is very strong. Note that the figures in the table are for both urban and rural areas regardless of the main occupations of the main earners of household.

Table 2.9: Mean Parity of Ever Married Women by Land Holding Area Own by Household, West Java, 1980

Land Holding (Ha)	Mean Parity
0.00	3.9
0.01 - 0.25	4.5
0.26 - 0.50	4.8
0.51+	5.3

Source: Special tabulation of the 1980 census (unpublished).

Table 2.10 looks closely at a specific group for whom land holding area is conceivably most sensitive as an indicator of socioeconomic status. The data in the table show mean parity to ever married women in households where the main earner was an agricultural operator working in food production and living in a rural area during the

Table 2.10: Mean Parity of Ever Married Women in Households Where the Main Earner is an Agricultural Operator Working in Food Production and Living in a Rural Area, by Agricultural Land Area and Selected Birth Cohort, West Java, 1980

Agricultural Land Area (Ha)	Birth Cohort				
	1931-1935	1936-1940	1941-1945	1946-1950	1951-1955
0.00	5.6(31.4)	5.6(45.3)	5.2(53.0)	4.2(54.4)	2.9(80.3)
0.01-0.10	5.9(18.9)	5.7(21.2)	5.2(24.7)	4.2(21.7)	2.9(28.3)
0.11-0.20	5.5(18.1)	5.4(22.2)	5.1(24.1)	4.1(21.9)	2.8(27.0)
0.21-0.25	5.7(19.6)	5.7(23.8)	5.2(27.5)	4.4(24.3)	3.0(32.3)
0.26-0.30	5.8(8.6)	5.4(10.0)	5.1(11.4)	4.0(8.9)	2.8(10.3)
0.31-0.40	5.9(8.6)	5.5(9.2)	5.3(10.1)	4.3(8.3)	2.9(10.2)
0.41-0.50	6.0(24.8)	5.7(28.7)	5.3(33.0)	4.5(26.9)	3.0(30.3)
0.51-0.75	5.9(13.5)	5.6(16.6)	5.2(17.1)	4.3(13.7)	3.0(13.7)
0.76-1.00	6.3(15.5)	6.1(19.0)	5.7(19.5)	4.6(14.5)	3.1(16.6)
1.01-1.50	6.6(8.2)	6.1(9.8)	5.5(9.4)	4.4(7.4)	3.0(6.2)
1.51-2.00	6.3(6.2)	6.2(6.8)	6.0(6.2)	4.9(4.7)	3.3(4.6)
2.01-3.00	7.0(4.2)	6.3(3.9)	5.5(4.6)	4.8(3.6)	3.1(3.2)
3.01-5.00	6.2(2.4)	6.7(2.3)	5.8(2.3)	4.9(1.3)	3.1(1.4)
5.01-25.00	7.9(0.7)	6.2(0.2)	6.3(0.4)	4.2(0.2)	2.0(0.2)
Correlation Coefficient	+0.86**)	+0.10	+0.79**)	+0.49*)	+0.77**)

Source: Special Tabulation of the 1980 census (unpublished).
Note : (1) Figures in parentheses indicate the number of women (in thousands).
(2) Correlation coefficients are significantly different from zero at five (*) or one (**)percent levels of significance. The coefficient for cohort 1946-1950 is statistically not significantly different from zero.

enumeration. The table clearly shows a high and positive correlation between agricultural area owned by households and mean parity of women living in those households except for cohort 1946-1950, for which the relationship is not statistically significant. The explanation for this pattern is beyond the scope of the available data.

CHAPTER THREE:
CHANGES IN THE CRUDE BIRTH RATE AND ITS COMPONENTS

Various measures used in the previous chapter have consistently indicated fertility decline in West Java. Yet this does not necessarily imply decline in the crude birth rate (CBR), simply because this measure is a composite indicator. Change in the CBR occurs not only because of fertility movement but also because of change in its other components. This chapter evaluates changes in the CBR and its components in West Java and examines the contribution of the components to overall CBR change in that province for the period 1980-1985.

The CBR, because of its composite nature, can be analyzed by way of division into four major components. It can be expressed as a multiple of the four as follows:

$$CBR = (W/P) \eth A_i.M_i.F_i$$

where (W/P) : proportion of women at child-bearing ages to total population;
A_i : proportion of women at age i;
M_i : proportion of currently married women at age i;
F_i : marital fertility of ever-married women at age i; and
i : childbearing age group i.

Appendix One of this study discusses further the logic and development of the expression above (based on U.N. Secretariat, 1979).

3.1 Decline in the Crude Birth Rate

Many users of population data, especially policy makers, prefer to use the crude birth rate (CBR) as the basis of their analysis of demographic change even though other measures are available. The main reason for this is

that the CBR can be directly related to population growth and it is relatively easy to calculate (Cho et al., 1980: 36).

The CBR for West Java has consistently declined since the period 1967-70 as shown by Table 3.1. The last

Table 3.1: Estimated Crude Birth Rate (CBR), West Java, 1967-1985

Period/Year	Model 1	Model 2
1967-1970	49.8[1)]	44.7
1971-1975	42.9[2)]	40.8
1976-1979	40.0[3)]	37.7
1981-1984	35.2[4)]	33.4
1980	34.8[3)]	34.2
1985	27.2[4)]	28.0

Source: Calculated from BPS (1974b; 1983c; 1987d; 1988a) and Kantor Statistik Jawa Barat (1980).

Note : a) The formula used for Model 1:

$$CBR = \delta\ ASFR_i \left(\frac{{}_fP_i}{P}\right)$$

where $ASFR_i$: age-specific fertility rate age i;

$({}_fP_i/P)$: ratio between female population aged i and total population.

Different data sources for the ratios are the 1971 census (1), the 1976 Intercensal Survey (2), the 1980 census (3) and the 1985 intercensal survey (4).

b) The formula for Model 2 is adopted from BPS (1988a:35) as follows:

$$CBR = 9.48968 + 0.00555\ TFR.$$

two figures in the table are better treated separately from the others because the method used for calculating their basic data is different (the Last Birth Method) from that used for others (the Own Children Method). Moreover, compared with those of Model 1, the figures of

Model 2 are very likely less reliable simply because the latter model ignores different age structures for different periods/years of estimation (see note for Table 3.1). Nonetheless, one thing is clear. The figures in the table provide a quite convincing picture of the consistent decline in the CBR in West Java.

The decline in the CBR, as expected, was not as rapid as the decline in the total fertility rate. For example, while the TFR declined by 32 per cent in the period 1967-70 to 1981-1984, the CBR declined by only 16 per cent (see Tables 2.3 and 3.1).

For comparison purposes the CBR should be standardized; that is, adjusted by using a common age structure. Standardized CBRs for the provinces of Java and Bali are given in Table 3.2, the age structure of the Indonesian population in 1980 being used as the standard age structure. Again, the last two columns would be better treated separately because of the methodological problem mentioned before. It is clear from the table that CBRs for West Java were always the highest.

Table 3.2: Standardized Crude Birth Rates for Provinces of Java and Bali, 1967-1985 (per thousand population)

Province	1967-1970	1971-1975	1976-1979	1981-1984	1980	1985
West Java	50	44	40	34	35	26
Jakarta	41	37	31	25	31	16
Central Java	40	38	34	30	32	23
Yogyakarta	36	33	26	22	24	18
East Java	37	34	29	26	26	20
Bali	46	39	31	24	27	19

Source: Calculated from BPS (1975; 1977b; 1983a; 1987b;1988a) and Hull (personal communication).

3.2 Changes in the Components of the CBR

As mentioned before, there are four major components of the CBR which are mathematically interrelated. Since one of them (marital fertility) has been discussed in Chapter Two (2.1.3), this section evaluates changes in the other three components.

3.2.1 Female Age Structure

The age structure of women in any society is associated with fertility because only women at certain ages (childbearing ages) are able to give birth. In general, age structure is mainly a function of past fertility rates, though past mortality rates also determine current age structure in less important respects (see, for example, Mauldin, 1981). For a few societies migration also plays a significant role in determining age structure.

Female age structure, in turn, determines fertility. A rise in the proportion of females of childbearing ages in the total population will result in a higher CBR if other factors remain constant. Furthermore, a rise in the proportion of women at the most fertile ages, typically 20-29, will also logically result in higher fertility all other things being equal (Mauldin, 1981).

Table 3.3 demonstrates how age structure in all provinces of Java and Bali has not been in favour of decline in the CBR. Indexes of the ratios of females aged 15-49 to total population and of females aged 20-29 to those aged 15-49 increased during the observed period. The increase in the first index was striking for West Java while that in the second index was considerable for Yogyakarta.

Table 3.3: Indexes of Ratios of Females Aged 15-49 to Total Population ($_fP_{15-49}/P$) and of Females Aged 20-29 to Those Aged 15-49 ($_fP_{20-29}/_fP_{15-49}$) for Provinces of Java and Bali 1971, 1980 and 1985

Province	1971	1980	1985
	$_fP_{15-49}/P$		
West Java	100.0 (0.212)	113.7	116.5
Jakarta	100.0 (0.252)	106.3	111.1
Central Java	100.0 (0.242)	101.7	101.2
Yogyakarta	100.0 (0.240)	104.2	105.8
East Java	100.0 (0.255)	101.6	102.4
Bali	100.0 (0.235)	104.3	108.9
	$_fP_{20-29}/_fP_{15-49}$		
West Java	100.0 (0.347)	104.9	111.2
Jakarta	100.0 (0.374)	104.3	112.8
Central Java	100.0 (0.299)	112.7	119.4
Yogyakarta	100.0 (0.290)	114.1	125.5
East Java	100.0 (0.311)	110.0	117.7
Bali	100.0 (0.345)	100.0	102.9

Sources: Calculated from BPS (1974a-f; 1983b-g; 1987c-h).
Note : Figures in parentheses are ratios.

Needless to say, changes in the age structure of the population of Java and Bali have tended to increase the crude birth rate in that region. Changes observed during 1980-1985 were fortunately not as important as those in other components of the CBR (see section 3.3).

3.2.2 Marriage Patterns of Females

A complete discussion of marriage patterns would include, borrowing Smith's (1983) terms, the prevalence, the timing and the stability aspects of marriage. As clearly shown by the mathematical expression in the first part of this chapter, only the first aspect is directly related to the crude birth rate, and it therefore is discussed in more detail.

The prevalence of marriage is best measured by the proportion ever married. However, because the primary interest of this thesis is in fertility, the proportion currently married is used as an alternative measure of prevalence. Table 3.4 shows percentages of women currently married by age in West Java. At least two important points can be derived from the table. First, sharp declines have occurred at ages below 25, especially in the period 1980-1985. The decline for age group 15-19 is particularly important since, according to Hull (1988a: 1), 'late adolescence (15-19)...has traditionally been a very fertile time for Indonesian women'.

Table 3.4: Percentage of Women Currently Married by Age Group, West Java, 1971-1985

Age Group	1971	1980	1985
15-19	44.4	40.2	26.5
20-24	81.4	81.0	74.5
25-29	88.9	88.7	89.1
30-34	88.9	90.2	91.6
35-39	85.1	89.1	89.8
40-44	76.3	82.7	86.6
45-49	69.4	77.7	77.8

Source: BPS (1974b; 1983c; 1987d).

The second point to be noted from Table 3.4 is that percentages reach a peak in the age group 30-34. Declines after that age group probably indicate increases in the

prevalence of marriage disruption and widowhood. The situation tends to be better in the more recent period and this, of course, is unfavourable for decline in the CBR.

Applying the Hutterite fertility schedule, Hull (1987b) has developed various indices of the prevalence and longevity of marriage in Indonesia. These indices seem to be convenient for comparison purposes because they are standardized (for level of fertility) and easy to interpret. Table 3.5 presents them for the provinces of Java and Bali. Panels two and three of the table measure prevalence while panels four and five measure the longevity of marriage in that region.

As shown by Table 3.5, the prevalence of marriage is higher for women in West Java than for women in any other province of Java and Bali. This is indicated by West Java having the lowest index of proportion single (Is) and the highest index of proportion married (Im).

Table 3.5 shows that marriage longevity in Java and Bali has tended to increase as indicated by the decreases in (Iw) and (Id). A small exception is found in West Java and East Java where (Id) increased in the period 1971-1980. A note should be given here that is that both (Iw) and (Id) are not standardized for (and therefore they can chanege in response to changes in) age structure and mean age at marriage. Therefore, This phenomenon is of course not conducive to decline in the CBR. Marriage instability, measured by (Id), for West Java has always been the second highest after East Java's. However, remarriage among the Sundanese has also been high as partly reflected by (Im) which is the highest in Java and Bali.

Table 3.5: Some Selected Marriage Indicators for Java and Bali by Province 1971, 1980 and 1985

Province	1971	1980	1985
Mean Age of Women at Marriage			
West Java	17.8	18.5	19.8
Jakarta	20.2	21.7	23.4
Central Java	19.0	19.8	21.0
Yogyakarta	21.8	22.5	23.4
East Java	18.7	19.4	20.3
Bali	20.8	21.2	22.3
Index of Proportion of Single Women (Is)			
West Java	0.095	0.130	0.179
Jakarta	0.220	0.304	0.363
Central Java	0.137	0.194	0.230
Yogyakarta	0.252	0.321	0.359
East Java	0.118	0.168	0.194
Bali	0.241	0.272	0.320
Index of Proportion of Married Women (Im)			
West Java	0.790	0.784	0.756
Jakarta	0.689	0.636	0.598
Central Java	0.750	0.728	0.706
Yogyakarta	0.669	0.627	0.597
East Java	0.784	0.740	0.729
Bali	0.700	0.690	0.650
Index of Proportion of Widowed Women (Iw)			
West Java	0.057	0.023	0.017
Jakarta	0.047	0.021	0.015
Central Java	0.063	0.028	0.020
Yogyakarta	0.041	0.018	0.014
East Java	0.075	0.032	0.026
Bali	0.037	0.017	0.012
Index of Proportion of Divorced Women (Id)			
West Java	0.058	0.063	0.048
Jakarta	0.044	0.040	0.024
Central Java	0.050	0.050	0.044
Yogyakarta	0.037	0.034	0.029
East Java	0.059	0.060	0.051
Bali	0.022	0.021	0.018

Source: Hull (1987b, Tables 1-5).

What has been favourable for fertility decline has been that the timing of marriage, expressed by the mean age of women at marriage, has been delayed in West Java as in other provinces of Java and Bali (Table 3.5). West Java is quite distinct in that it has at all dates the lowest mean age at marriage.

To reitrate, compared to those of other provinces of Java and Bali the marriage pattern for West Java is quite different. This phenomenon has likely had a long history. Timmer (1961: 37), for example, notes that the percentage of unmarried 'adult' women for West Java in 1930 was 4.4 as compared with 9.5 for Yogyakarta. Regarding marriage stability, Timmer (1961: 39) notes that in the same year the number of divorces per 1000 married men for West Java was 64 as compared with 47 for Java. This information, however, does not undermine the importance for CBR decline of changes in marriage patterns that have been occurring more recently.

3.3 Contribution of the CBR Components

The previous section has discussed changes in components of the CBR. It would be interesting to have a picture of the extent to which each of these changes has contributed to change in the CBR. This section examines the relative contribution of changes in each component to CBR decline in West Java in the period 1980-1985. The situation during 1971-1980 cannot be examined because 1971 census data do not allow us to calculate the age-specific fertility rates (ASFR) for a single year (1971) which are needed in the decomposition procedure. (The last birth method which enables us to calculate ASFR in a single year cannot be applied to 1971 census data.)

The contribution of change in age structure to decline in the CBR may be positive (tends to decrease the CBR) or negative (tends to increase the CBR). A

considerable positive contribution has been found for countries such as Sri Lanka in the period 1953-56 and Hongkong in 1961-65 (Mauldin, 1981: 90). Age structure was also found to have contributed positively to declining CBRs in most states of India in the period 1972-1984 (Srinivasan, 1988: Table 17).

Marked negative contributions of change in age structure to CBR decline are found, among other places, in Taiwan for the period 1970-1975 and in the Philippines for 1960-1968 (Mauldin, 1981: 91). For West Java, as Table 3.6 clearly shows, age structure (A) and also the proportion of women of reproductive age (W/P) have had negative impacts on decline in the CBR. These negative impacts, shown by positive signs in Table 3.6, are as expected from previous discussion. Theoretically, changes in marital status (M) and in marital fertility (F) may have positive or negative impacts on CBR decline. However, positive impacts are more likely to occur, especially in developing countries where women are tending to marry later and birth control practices are tending to be more prevalent. Mauldin (1981), for example, finds that both variables make some positive contribution to CBR decline in all nine countries he observed in 1953-1975. As Table 3.6 shows, in West Java both variables have contributed positively to CBR and GFR (General Fertility Rate) declines, and each has contributed much more strongly than either age structure (A) or the proportion women of childbearing age make up in the population (W/P).

Note that using 1980 and 1985 base populations yields different results for the decomposition of CBR and GFR changes, though the differences are not large (see Table 3.6). Moreover, for the 1980 base population, a small difference is found between the 'total explained' and the 'total observed' figures. This happens largely because of the existence of interaction effects between

components. In Table 3.7 these effects have been allocated to each major factor (see Appendix One for an explanation of the allocation method).

Table 3.6: Changes in Crude Birth Rate (CBR) and in General Fertility Rate (GFR) in West Java in 1980-1985: Results of Decomposition into Factors (1980 and 1985 bases)

Factor	Changes in CBR (per 1 000)	Changes in GFR (per 1 000)
Base population, 1980		
Age Structure (A)	+ 1.1	+ 4.4
Marital Status (M)	- 2.8	-11.4
Marital Fertility (F)	- 6.5	-26.9
Proportion of women of reproductive ages in total population (W/P)	+ 0.8	
Total explained	- 7.4	-33.9
Total observed	- 7.3	-32.9
Base population, 1985		
Age Structure (A)	+ 1.0	+ 4.0
Marital Status (M)	- 2.4	- 9.7
Marital Fertility (F)	- 6.5	-26.3
Proportion of women of reproductive ages in total population (W/P)	+ 0.6	
Total explained	- 7.3	-32.0
Total observed	- 7.3	-32.9

Source: Derived from BPS(1983c; 1987d).
Note : 1) Data and procedure for calculation are presented in Appendix One.
2) Small differences between 'explained' and 'observed' totals are partly due to interaction terms, partly due to rounding errors.

Table 3.7 shows that age structure (A) had a negative impact on CBR decline in all provinces in the period 1980-1985. Smaller negative impacts were recorded

for the proportion of women of childbearing age in the population (W/P). The contributions in the opposite direction of changing marital status (M) were much more

Table 3.7: Standardized Changes in Crude Birth Rate by Factors in Provinces of Java and Bali in 1980-1985 (Base population, 1980)

Province	Factor				Total Changes
	A	M	F	W/P	
West Java	+ 1.0	- 2.6	- 6.4	+ 0.7	- 7.3
Jakarta	+ 1.1	- 3.9	-12.8	+1.2	-14.4
Central Java	+ 0.9	- 2.3	- 5.9	-0.1	- 7.4
Yogyakarta	+ 1.3	- 2.6	- 3.8	+ 0.4	- 4.7
East Java	+ 0.7	- 1.6	- 4.2	+ 0.1	- 5.0
Bali	+ 0.3	- 3.0	- 5.0	+ 1.0	- 6.7

Source: Derived from BPS (1983b-g, 1987c-h).
Notes : See Table 3.6 for definition of factors and note 1 of Table 3.6 for procedure of calculation.

important than those of the two factors already mentioned.

The most important contributions to decline in the CBR were made by marital fertility (F). This is true for all provinces in Java and Bali. For West Java, out of a total change of -7.3 in the CBR, factors F and M accounted for -6.4 and -2.6. These were offset by factors A and W/P which operated to raise the CBR by +1.0 and +0.7. As a comparison, in the total CBR decline for Bali of -6.7, factors F and M accounted for -5.0 and -3.0 respectively, and were offset by factors A and W/P which together added +1.3. The relatively smaller contribution of factor F to CBR decline for Bali than for West Java

probably reflects the fact that in Bali the family planning programmed has been especially successful, so that more marital fertility decline had already taken place prior to 1980 (see, for example, Streatfield, 1986).

It has been posited that marital fertility decline is associated with the family planning programme. As the U.N.Secretariat (1979: 7) writes:

> The role of marital fertility and the changes brought about by this variable [marital fertility] may be attributed to the family planning programme if evidence is sufficient to warrant such a conclusion.

Although it is very difficult, if not impossible, to prove, the 1980 census and the 1985 survey data have probably provided 'sufficient evidence' in the case of Java and Bali (Table 3.8). It should be noted that according to Streatfield and Larson (1987:4) the SUPAS (the 1985 survey) data underestimates 'the true FP [Family Planning] prevalence rate in October 1985'. If this is true, the figures in the last column of Table 3.8 should be considered as underestimates, assuming the 1980 data are accurate.

Table 3.8: Contraceptive Prevalence Rate for Married Women Aged 15-44 for Selected Provinces, 1980 and 1985 (percentage).

Province	1980	1985	1980-85 Increase
West Java	23	47	24
Jakarta	26	46	20
Central Java	33	43	10
Yogyakarta	42	57	15
East Java	39	44	5
Bali	49	65	16

Source: Streatfield and Larson (1987: Table 2).

3.4 Hypothetical Births Averted

Evaluators of the family planning programme are primarily interested in births that did not occur as a result of change in marital fertility (U.N. Secretariat, 1979: 28). This section estimates the hypothetical number of births that did not occur in West Java in 1985 due to changes during 1980-85 in marital fertility as well as in the other components of the CBR.

Given the assumption of unchanged components between 1980 and 1985, the hypothetical number of births can easily be calculated by multiplying the CBR in 1980 by the total population in 1985. The difference between this hypothetical number and the actual number of births is the number of births assumed to have been averted. For West Java this averted number of births was 234 520. An important note here is that this hypothetical number of hypothetical births is for a given calendar year (1985 in this case) and does not represent for the total births averted over a period of time (say 1980-1985) (see U.N. Secretariat, 1979: 27).

A question that is interesting to answer now is how change in each component of the CBR has contributed to the averting of births. Table 3.9 provides the answer. It can easily be seen from the table that marital fertility (F) has made the most important contribution.

The total number of births assumed not to have occurred as shown by Table 3.9 is slightly different from the figure calculated above: 226 603 compared to 234 502, a difference of 7917. In other words, the standardization approach has accounted for 97 per cent of the averted births.

The same calculation procedure applied to the of Bali results in the 17 751 births averted in 1985. Out of this number, factors F and M accounted for 62 and 38 percent respectively.

Table 3.9: Contributions of Standardized Changes in CBR Factors to Hypothetical Number of Births Averted, West Java, 1985 (Base Population, 1980)

Factor	Change (per 1000)	Hypothetical Number of Births Averted
(1)	(2)	(3)
A	+0.00103	+ 31 755
M	-0.00258	- 79 542
F	-0.00649	-200 089
W/P	+0.00069	+ 21 273
Total		- 226 603

Source: See Source of Table 3.6.
Note : 1) See Table 3.6 for definitions of factors.
2) Column 3 is obtained by multiplying column 2 by total population in 1985.

Changes in the CBR and in its major components have been evaluated and the relative contribution of each component of CBR change has been examined. The discussion has provided some 'demographic' explanation of fertility decline in West Java. 'Socioeconomic' explanation in a broader context is also important since it is hard to imagine that fertility decline could have occurred without socioeconomic development.

CHAPTER FOUR:
SOCIOECONOMIC CONTEXT
OF FERTILITY DECLINE

Some observers argue that Indonesia is a case of rapid fertility decline without significant economic development (see, for example, Teachman, 1979: 116; van de Walle and Knodel, 1980: 37). In contrast, without presenting appropriate data, Hull (1987a: 13) argues that the country has actually experienced a very substantial increase in per capita income and, more importantly, that the structure of the economy and its institutions 'have changed dramatically, in ways which are largely conducive to fertility decline'. The difference in these arguments is very likely the result of different dates of observation. The former observers had no chance to witness the rapid economic growth in the country which has happened in the more recent period. The purpose of this chapter is simply to set out some of the major aspects of socioeconomic development in West Java which conceivably have been conducive to fertility decline.

The attempt at a comprehensive discussion leads this chapter to be more speculative than previous ones. The main premise is that the issue to be discussed is too complex to be treated in a 'conventional' deterministic way.

4.1 Development and Fertility: Overview

4.1.1 Major Dimensions of Development

Socioeconomic development is a multi-dimensional phenomenon. It is very difficult, if not impossible, to isolate the effect of a particular aspect of development on human behaviour such as fertility. For example, while McNicoll (1975: 1) argues that the process of urbanization has historically and in the contemporary world created an environment such that 'individuals find it strongly in

their own interest to limit births', Handwerker (1987: 7) believes 'that any macro-correlation between urbanization and changes in fertility must reflect the operation of other variables'.

At the micro level of analysis microeconomists postulate that reproductive performance is simply economic behaviour. However, they differ among themselves and the most decisive difference, according to Hawthorn (1980: 3), 'is between those who assume that children are inferior goods and those who do not'. While the first group (including Easterlin) argue that the positive effect of income on fertility 'is more than offset by the positive effect of income on propensity to consume normal or superior goods', the second group (including Becker) argue that it 'is more than offset by the propensity to pay a higher price for each child' (Hawthorn, 1980: 4). Both Easterlin and Becker, however, are more concerned with the formal development of their theories than with their testing (Crosbie, 1986: 33). As Crosbie writes, a number of attempts to examine their theories have produced inconsistent, inconclusive, conflicting and/or confusing results. To reiterate, isolating the impact of particular aspects of socioeconomic development on fertility seems to be a difficult exercise. This is because of the multi-dimensional character of socioecomic development.

According to the U.N.(1987: 5), some of the major dimensions of socioeconomic development include:

> ...level of economic production, level of education, level of services, degree of urbanization, status of women, level of nutrition, quality of housing, distribution of goods and services, and access to communication.

Using the above variables, the U.N. (1987: 8) constructs a composite index of level of development which is claimed to be 'fairly robust'. The U.N. (1987: 22) finds 'a strong relationship between the level of recent fertility and

development.' that is 'women in countries in the high development...are estimeted to have, on average, two children fewer than in countries in the low development...'.

One may think then that improvement in variables mentioned above may lead to lower fertility, sooner or later. West Java, like other provinces in Indonesia, has experienced a substantial improvement in most, if not all, of these areas (see sections 4.2-4.4). Not all of them, however, can be discussed here because of the absence of reliable data or because of problems of measurement.

4.1.2 Problems of Analysis

The complex relationship between economic development (or 'modernization') and population change is widely recognized. Despite this, there is 'a tendency of demographers to eschew theory and concentrate upon careful measurement' (Hugo et al., 1987: 4). More importantly, the causal linkages between the two 'are not always one way' (Hugo, 1987: 5). Goldscheider (1985), using a careful, comprehensive and systematic sociological analysis, has shown many ways through which modernization and demographic processes interrelate.

Possibly to simplify the problems, demographers often assume, explicitly or implicitly, that there is only a one-way relationship: aspects of modernization or economic development on one hand as independent variables and demographic measures on the other hand as dependent variables. As the following examples show, this approach does not always give satisfactory results.

The first problem which confuses our understanding is methodological. As Teachman (1979) noted, different methodologies applied to the same data source may lead investigators to different conclusions. While Teachman et al. (1978, cited in Teachman, 1979: 16) argue that the

recent Colombian fertility decline can be attributed to family planning programs 'regardless of socioeconomic change', Potter (1977, cited in Teachman, 1979: 116) feels that it 'cannot be separated from socioeconomic development in the country'. Teachman (1979) did not clarify the specific methodological difference in the studies that he cited.

'Type' of data probably should also be noted as an important source of difficulty. Teachman observes that quantitative studies which arrive at the conclusion of an inverse relationship have been almost always based on cross-sectional data. In contrast, those who used longitudinal data (for single nations over time) indicate that 'there does not seem to be a univariate relationship between economic development and fertility' (Teachman, 1979: 115).

4.1.3 Direct and Indirect Effects

Leaving aside problems of the complexity of the relationship, one can probably distinguish direct and indirect effects of economic development or modernization on fertility. According to Heer (1966, cited in Messey and Tedrow, 1976: 429), the direct effect of economic development is increased fertility and as indirect effect 'it gives rise to a set of associated circumstances which in turn produce a decline in fertility'.

The direct and positive effect operates especially in societies with a low 'absolute level of living' by 'improving the material conditions of life (better nutrition, improved health, lower infant mortality, etc.)' (Stokes et al., 1979: 18-19). However, it may also operate in more modern societies. As Wrong (1966: 54) writes, contemporary customs and conditions in those societies, such as greater leisure and better obstetrical care, may be favourable, at least hypothetically, to higher fecundity

and fertility. Nag (1980: 23), through an extensive survey, has listed four factors of 'modernization' which may positively affect fecundity and fertility. These are:

> ...(1) earlier resumption of ovulation and menstruation during the postpartum period as a result of decreased breastfeeding, (2) decline in the practice of postpartum abstinence, (3) reduction in the loss of reproductive performance of women caused by early widowhood, (4) reduction in the incidence of sterility as a result of improved treatment of venereal disease.

'Modern' habits and customs which also can be found to have increased in LDCs, especially within middle and upper classes, may also have an unintended negative effect on fecundity and fertility. Examples of such 'modern' habits are nervous strain (which tends to decrease intensity of sexual urges and frequency of intercourse), greater use of soap and use of an effective spermicide (Wrong, 1966). Nonetheless, it is hard to see 'how involuntary causes could have made more than a minor contribution to the decline in family size' (Wrong, 1966: 54-55).

A more important class of negative effects of modernization on fertility is voluntary causes. Modernization generally leads 'to a reduction in the demand for children or desire for a large family which, in turn, induces couples to practise contraception and induced abortion as methods of birth control' (Nag, 1980: 1). It should be noted that induced abortion is very unlikely to be widely practised by Indonesian women because of religious beliefs. In addition, abortion will never become a part of the Family Planning Programmes in Indonesia, at least in the near future. This has been explicitly stated by the President of the country (Kompas, January 13th 1988).

The relationship between economic development and fertility change can be summarized in the following general propositions. Socioeconomic development has both a positive

and a negative impact on fertility behaviour. The final result, accordingly, is determined by the net influence. McNicoll (1975: 1) is probably right, at least from a long run perspective, when he writes that it can be 'reasonably claimed that socioeconomic development will eventually ameliorate (though certainly not painlessly) the problem of high fertility'. We turn now to discuss the socioeconomic context of West Java by looking closely at the major dimensions of socioeconomic development in that province.

4.2 Domestic Product and Income Distribution

According to the U.N. (1987), the major dimensions of economic development include level of economic production. While at the national level Gross National Product (GNP) or Gross Domestic Product (GDP) are widely used as measures, at the provincial level Gross Regional Domestic Product (GRDP) can probably be used in a similar way. For comparison, the indicators should be weighted by population size.

GRDP for West Java has increased substantially since the 1970s. During the third Pelita (Five-Year Development Plan), 1978/79-1982/83, GRDP (at current prices) for that province increased by about 157 per cent from about Rp 3,015 billion to Rp 7,758 billion (BPS, 1987a: Table 10) (in 1982, $A1 ~ Rp 700). GRDP has clearly grown much faster than the population, as is shown by the increase in per capita GRDP of about 133 per cent between 1978 and 1984. As a comparison, the increases in per capita GRDP for Central Java and East Java over the same period were 138 and 149 percent respectively (BPS, 1986a: Table 11.11).

Since by definition per capita GRDP is a function of population size, it is obvious the improvement in this indicator should necessarily be influenced by population growth. Looking from this perspective, any attempt to reduce population growth is economically justified.

In line with the improvement in per capita GRDP the structure of the economy in West Java has changed in a way which Hull (1987a: 13) believes to be conceivably conducive to fertility decline. This change can be seen most simply from the decline in the proportion of employed persons in agriculture from 62.6 per cent in 1971 to 48.2 per cent in 1980 and 46.8 per cent in 1985 (BPS, 1974b, 1983c, 1987d). The contribution of agriculture to total GRDP has also continuously declined. BPS (1987a: Table 36) shows this 'traditional' sector contributed 31.4 per cent in 1978 but only 21.2 per cent in 1984. In contrast, there were increased contributions to total GRDP from 'modern' sectors such as mining and quarrying, construction, transportation and communication.

Per capita GRDP may be questionable as an indicator of level of well-being of the majority of the people. One may argue that the improvement in GRDP may have been absorbed by a minority wealthy elite. This is probably true to an extent. However, West Java is relatively egalitarian in terms of income distribution. This characteristic, because of its intimate relationship with the well-being of the majority of the people, is discussed in more detail.

The most widely used measure of income distribution is probably the Gini Coefficient. Gini Coefficient ranges from 0 (represents the most inequal distribution) to 1 (represents the most perfect or equal distribution). The coefficient for West Java in 1976 as calculated by Islam and Khan (1986) was quite small, 0.298, which indicates income distribution in that province was relatively equal. As a comparison, the national figure in the same year was 0.330, hardly any greater. Hugo et al. (1987: 6), however, felt that the national figure indicated a 'significant degree of inequality', but according to Papanek (1980, cited in Hugo et al., 1987: 6) it is 'relatively egalitarian when set against other comparable countries'.

A provincial comparison made by Islam and Khan (1986: Table 4) shows West Java as the most egalitarian province in Java, while Bali is the most egalitarian in Indonesia and Jakarta is the second least egalitarian. They also find (1986: Table 9) the level of poverty in West Java is the second lowest among the provinces of Java and Bali after Jakarta's (the lowest in Indonesia). However, the incidence of poverty, sometimes called absolute poverty, in West Java was quite large in 1976: 25 per cent in urban and 41 percent in rural areas. As a comparison, the percentages for Central Java were 33 in urban and 68 in rural areas (Leiserson et al., 1980 cited by Hugo et al., 1987: 85).

More recent data on income distribution are provided by the Central Bureau of Statistics based on the National Socio-Economic Survey (Susenas). It should be noted that the survey uses the 'expenditure' approach, which possibly 'underestimates actual income disparities' (Sigit, 1985: 51). It may be argued, however, that the results of this approach can still be valuable if it can be assumed that expenditure data do not cause misclassification of households according to income.

The magnitude of income disparity in West Java in 1978 is reflected by the fact that the richest class, the upper 20 per cent of the population, accounted for more than 48 per cent of total expenditure in urban and 40 per cent in rural areas. In contrast, the lowest class, that is the lowest 20 per cent, spent less than seven per cent of the total in urban areas and ten per cent in rural areas (see Table 4.1). However, as the Table shows, the situation was getting better.

In general it is probably true that uneven income distribution is a result of unequal access to the means of production. For the people in rural areas, where land is an

Table 4.1: Estimated Per Capita Expenditure Distribution and Gini Coefficients for Selected Provinces in Java, 1978 and 1984

Decile*/Gini Coefficient	West Java		Central Java		East Java	
	1978	1984	1978	1984	1978	1984
			Urban			
1 st	2.8	3.3	2.5	3.2	3.0	3.7
2 nd	3.7	4.9	3.5	4.9	4.1	5.7
3 rd	4.3	4.9	4.5	6.4	4.6	6.2
4 th	5.1	6.5	4.9	6.4	5.8	6.2
5 th	5.5	6.8	6.4	7.8	6.7	8.3
6 th	8.4	9.0	8.5	9.0	7.6	8.6
7 th	9.3	9.6	9.8	10.9	9.1	11.2
8 th	12.3	10.7	11.6	12.4	10.7	12.0
9 th	20.2	15.2	17.6	13.5	14.5	14.2
10 th	28.3	29.0	30.6	25.6	33.9	23.8
Gini Coefficient	0.403	0.353	0.407	0.314	0.402	0.293
			Rural			
1 st	4.5	4.4	4.4	4.4	4.2	3.9
2 nd	5.3	6.0	4.4	5.9	4.5	5.7
3 rd	5.5	7.0	5.4	6.8	6.7	5.9
4 th	7.3	8.1	7.1	6.8	6.7	7.4
5 th	7.3	8.1	7.1	8.5	6.9	7.6
6 th	8.8	8.1	8.2	8.6	9.2	10.0
7 th	9.6	10.2	9.9	11.4	9.3	10.0
8 th	11.7	11.3	11.8	11.4	11.9	10.3
9 th	14.3	14.6	14.6	13.3	15.1	14.2
10 th	25.5	22.1	27.2	23.0	25.6	25.0
Gini Coefficient	0.298	0.254	0.328	0.263	0.308	0.287

Source: BPS (n.d., unpublished).

Note :*/ Ranked from the lowest to the highest.

important source of income, it is interesting to examine the distribution of landholders.

Although inequality of landholdings in Indonesia is not as great as in other Asian countries (BPS, 1977a: 53), its existence seems to be quite significant. In 1973, for example, about 12 per cent of agricultural households were nearly landless. The figure for Java was 16.0 per cent and that for West Java was only 12.3 per cent (BPS, 1977a: 32). Inequality is more clearly shown by Gini Coefficients for landholders. For West Java, the coefficients in 1973 were 0.469 for wet land and 0.544 for dry land; while for Java the figures were 0.443 and 0.491 for wet land and dry land respectively (BPS, 1977: 50).

There are no more recent data available which are directly comparable. The classifications of land area used in the 1973 Agricultural Census and the 1980 Population Census are different. However, a rough estimate indicates that the percentage of households having a land area less than 0.50 ha in Indonesia increased from 45.7 per cent in 1973 to 63.1 per cent in 1980 (BPS, 1981: 10). In addition, the 1980 census shows 51 per cent of households engaged in agriculture in West Java owned less than 0.25 ha of land, compared to 44 per cent in Java and 34 per cent in Indonesia, (BPS, 1981: 34).

The above discussion suggests a poor landholding distribution which is much more inequitable than the income distribution discussed earlier. Yet there is no strong correlation found between the two and this implies that, among other possible explanations, income from sources other than agriculture is for many people an important supplement to income from agriculture (BPS, 1977: 53).

Per capita income (measured roughly by per capita GRDP) and its distribution for West Java have been discussed. There seems quite strong evidence that an improvement in living standards has occurred in that province. One problem that would be of interest for both policy makers and researchers has not been discussed so

far. This concerns the relationships between per capita income and fertility, and income distribution and fertility. Unfortunately, the literature on these issues gives no clear or satisfactory conclusions.

Friedlander and Silver (1967) find the statistical association between per capita income and fertility is not clear. A similar finding is reported for income distribution-fertility relation which is difficult to interpret since the mechanism 'through which income distribution affects fertility still needs to be mapped out' (Eberstadt, 1981: 16). Further research on this relationship might be needed. What is clear is that an improvement in per capita income and its distribution is a necessary (though not sufficient) condition for raising the living standard of the majority of the people. The possible impact of these variables on fertility decline, if any, should then operate through 'living standard' variable(s).

4.3 Green Revolution and Agricultural Involution

A very, if not the most, important characteristic of economic change in Indonesia in the last two decades has been the so-called Green Revolution. Hull (1987a: Figure 3), for example, in his conceptual framework rated it number one in importance before industrialization.

The beginning of the revolution was marked by the release of IR8 and IR5, two modern varieties of paddy, from the International Rice Research Institute in 1967 (Ward, 1985: 13). Many other varieties, mostly categorized as 'High-Yield Variety' (HYV), have been developed and made widely available to farmers. At the same time mechanization of agricultural practices has been introduced. As a result, the area of harvest and production of paddy, the main staple for Indonesians, has rapidly increased every year. In the period 1980-1984 for example, the harvested area increased by 8.4 per cent from 9.0 to 9.8 million hectares

while the production increased by 28.6 per cent from 29.7 to 38.1 million tons. West Java has contributed quite significantly, more than one-fifth, to the national figures (see Table 4.2). In addition, the yield-rate of paddy has increased. For example, the yield of wet-land (sawah) paddy in West Java increased from 36.8 to 44.3 hundred kilograms per hectare between 1980 and 1984 (BPS, 1986: Table 5.1.10).

Table 4.2: Area Harvested and Production of Paddy in West Java, Java and Bali, and Indonesia, 1980 and 1984

	West Java	Java and Bali	Indonesia
	Area Harvested ('000 Ha)[1]		
1980	1 859.2	4 958.6	9 005.1
1984	2 012.6	5 380.1	9 763.6
Absolute Increase	153.4	421.5	758.5
Relative Increase (%)	8.3	8.5	8.4
	Production ('000 Ton)[2]		
1980	6 594.5	19 146.4	29 651.9
1984	8 527.6	24 459.2	38 136.4
Absolute Increase	1 933.1	5 312.8	8 484.5
Relative Increase (%)	29.3	27.7	28.6

Source: BPS (1986a, Tables 5.1.3 and 5.1.6)

Note : 1) Wet- and dry-land paddy.
2) Dry unhusked rice (gabah kering giling).

Production and yield-rates of many crops other than paddy such as maize, cassava, sweet potato, peanuts and soybeans have also increased in Indonesia. Again, the contribution of West Java has been substantial (see BPS, 1986: Chapter 5).

Increases in production and yield-rates of agricultural crops are not without limit. An interesting question arises about how long continuous increases in agricultural outputs can be maintained in an area where

land for agriculture has long been limited. Montgomery and Sugito (1976: 18), for example, show in West Java in 1963-1973 the area of sawah land increased only by 0.62 per cent per year while that of dry-land decreased by 0.33 per cent per year. (This is still much better than in other provinces of Java.) The situation could be made worse by the increasing need for land for various purposes other than agriculture, a logical consequence of population growth.

Another important question that arises concerns the distribution of total agricultural outputs. One may argue that the profit from high-yielding varieties and other components of Green Revolution technologies might have fallen to the traditional elite in society, a typical situation in LDCs such as Bangladesh (see McNicoll, 1978). The answer to this question is difficult and has long been a controversial matter since the appearance of what Geertz (1963) called 'agricultural involution', a process resulting from the historical interplay between population and agriculture in Indonesia.

According to Geertz (1963: 35) agricultural involution, which was made possible by the fertile ecology of the Indonesia wet rice terraces, enables Javanese society to absorb population growth 'without a serious fall in per capita income'. He believes that even under the pressure of a decreasing number of limited sources of economic activity, the society is still able to maintain

> ...a comparatively high degree of social and economic homogeneity by dividing the economic pie into a steadily increasing number of minute pieces, a process to which I [Geertz] referred to elsewhere as shared poverty (Geertz, 1963: 97).

The 'comparatively high degree' of homogeneity seems to be the case when a comparison of landholding distribution is made between Indonesia and other countries such as the Philippines, Thailand, India, or even South Korea and Sri

Lanka for the same period (see, for example, Montgomery and Sugito, 1980: 358-9).

Geertz's thesis has long been very influential. Observers of Indonesia's agriculture have inevitably referred to the involution paradigm, whether they agree or disagree with Geertz's approach, and Geertz's model has even become almost 'obsessive' (Gerdin, 1982: 54, cited in White, 1987: 108). However, criticism of the thesis has increasingly appeared especially since the Green Revolution era. The following is summary of the critics' arguments (Khan, 1985: 70):

> ...among the consequences of Java's so-called Green Revolution has been the end of village egalitarianism, the demise of village institutions that functioned to share out poverty, and the development of capitalistic forms of economic calculation in agricultural enterprises...Based on research findings...[they] point to increase in landlessness, increased inequalities in the distribution of land, a decline in the importance of full-time farming as an occupation, a fall in agricultural employment caused by the adoption of labour-saving techniques by larger landowners, unequal access to credit - in short unequal distribution of the benefits of the new technologies. In the case of Java these ...have led researchers to their strong conclusion, i.e. that involution is dead .

Unintended impacts of new agricultural technologies in the form of increasing inequality are also found in Bangladesh, where they have operated 'by giving further impetus to commercialisation of farming - sharpening the once hazy line between landowner and wage laborer' (McNicoll, 1978: 62).

In a more specific way, Collier et al. (1974) have also questioned Geertz's thesis by showing the negative impact of the use of the rice huller, one new kind of technology introduced during the Green Revolution era, on the poor people in rural Java. The huller, according to Collier et al., has reduced the earnings of labourers

engaged in hand-pounding in Java by as much as U.S. $50 million annually. Most of those losing hand-pounding work are likely to have been the members of the poorest families, with little or no access to land. The spread of the rice huller is 'worsening' the income distribution substantially (Collier et al., 1974: 106-7). In addition, citing Sadli (1973) and Birowo (1973), Collier et al.(1974: 107-8) write that the huller can shake the foundation of village life and can intensify the employment problem in the villages.

Some of the anti-involution arguments, however, as discussed in detail by Khan (1985), seem to be misplaced. If it is true that the income distribution in rural Java has become worse, this should be evidenced by an increase in the Gini Coefficient of inequality. In fact, as discussed before, this has not occurred.

To sum up, the Green Revolution and mechanization in agriculture may have some immediate negative impact on life in rural Java. However, this should not necessarily totally undermine the improvement brought about by the revolution to the general welfare of the society by intensifying the increase in agricultural production. How the revolution has influenced fertility is probably a complex matter. If the anti-involution argument is valid, the revolution has probably intensified the unemployment problem in rural Java and this has probably stimulated poor farmers to migrate (permanently or seasonally) to urban areas seeking work other than farming. This situation is observable in large cities in Java and may be conducive to fertility decline. In addition, mechanization in agriculture may reduce the role of children in farming work and thus tend to decrease the perceived advantage of having additional children for parents.

4.4. Basic Services and Social Welfare

Along with the improvement in per capita GRDP, public services in West Java have generally been better. This is evidenced partly by the fact that the number of public health and educational facilities increases every year. The numbers of hospitals and of public health centres (Puskesmas) in the province substantially increased in the period 1980-1984 (Table 4.3). These increases are very likely responsible for the improved health status of the people as measured by infant mortality and life expectancy.

Table 4.3: Number of Hospitals, Hospital Beds and Public Health Centres, West Java, 1980 and 1984

	1980:	1984:
Hospitals	95 (3.3)	113 (3.7)
Hospital beds	10 842 (376)	11 090 (365)
Public Health Centres	523 (18)	666 (22)

Source: BPS (1986a: Tables 4.2.1 and 4.2.2)
Note : Figures in parentheses indicate number per one million people.

Educational facilities have also improved, though it seems not without problems. For elementary school, since it has become compulsory, there is probably no more serious problem than the supply of trained teachers. For Junior High School (general and vocational) it seems the increase in supply of school facilities and of teachers is hindered by the overflow of pupils. This situation is found in West Java but not in Central and East Java. For West Java, the absolute numbers of schools and of teachers of Junior High School increased by 19 and 22 per cent respectively in the period 1982/83-1984/85 while the number of pupils increased by about 26 per cent (BPS, 1986a: Tables 4.1.5-4.1.7). This is partly because the gross enrolment ratio for children aged 7-15, regardless of their school level, increased significantly from 51 per cent in 1971 to 75 per cent in

1980 and 83 per cent in 1985. As a comparison, the figures for Central Java were 53, 77 and 87 per cent in the same years (BPS, 1974c, 1983d, 1987e).

The increase in the gross enrollment ratio is possibly partly a result of more successful family planning, reducing the number of school age children from each family. On the other hand, the increase in the school participation rate has likely created not only new aspirations about family life for young people but also new norms about the value of children for their parents.

Development of communication infrastructure and facilities which has occurred in West Java, as in other parts of the country, should also be noted as an important part of economic development in that province. While in 1971 there were only about 10 000 kilometres of road (76 per cent asphalted) in the province, in 1985 the figure had risen to more than 15 000 km (66 per cent asphalted) (Kantor Statistik Jawa Barat, 1979; BPS, 1986a). In the meantime the use of various communication facilities such as telephones, television and telegrams increases every year (BPS, 1986a: Chapter 8). As an example, the number of television sets registered increased from about 437 000 in 1981 to more than one million in 1985 (BPS, 1986a: Table 8.5.7). This increase might be of great importance to fertility decline.

A television set is an effective communication medium. Information about family planning, the advantages of a small family and other related messages can be effectively delivered through this medium. The government of Indonesia has long felt this and has used television in persuading its people to behave in a way that can be beneficial for collective demographic and development interests. Moreover, the increased use of this medium by the people is a reflection of the improvement in their living standards, since a television set is relatively expensive for them. It

is probably also a reflection of what Hull (1987a: 13) calls changes in modes of consumption as a response to changes in modes of production.

Discussion so far has been about direct, contrasted with outcome or result, indicators of economic development. A direct indicator of development such as per capita GRDP, amount of agricultural production, or numbers of health and school facilities could become a good yardstick of the social welfare of the majority of the people if economic development has a tendency to 'trickle down' to the poor automatically (see, for example, Hicks and Streeten, 1979). This is, unfortunately, not always the case. Outcome indicators (indicators of social/demographic outcome) such as the literacy rate, infant mortality rate and life expectancy at age one then become important since they more directly measure welfare levels.

Morris (1979) has explained the importance of such indicators. The literacy rate, according to Morris, is a useful indicator since it measures both a level of well-being and a skill that is important in the development process. Infant mortality, he writes further, is a sensitive surrogate for the availability of clean water, the condition of the home environment, and the well-being of the mother. On the other hand, life expectancy at age one, according to Morris (1979), reflects nutrition and general environmental circumstances outside the home.

Using these three indicators Morris (1979) created a composite index called the Physical Quality of Life Index (PQLI) ranging from 0 (the worst) to 100 (the best). According to Morris and McAlpin (1982, cited in Sayogyo, 1984: 9) the index 'captures the total effect of social and economic policy as well as how private income is spent'.

Accepting the weakness of the index such as the lack of theoretical ground for selecting and weighting variables

(see Hicks and Streeten, 1979: 577), the PQLI is probably quite useful for measuring the level of social welfare, especially when appropriate alternative data are not available. Based on this index, West Java has experienced a substantial improvement in the social welfare of its people (Table 4.4).

Although this improvement has not been as great as in other provinces of Java, it will be an important basis for continuing fertility decline in the future. A note for policy makers, however, should be given here. Any attempt to raise the index requires multi-sectoral action. To increase life expectancy at age one, for example, does not necessarily require too much emphasis to be given to health measures such as increasing numbers of doctors, clinics and the like. Other measures which are not obviously related to health, like improving jobs, earnings, and the environment, should also be considered (Hicks and Streeten, 1979). It should be admitted, however, that these all require strong economic and political support to accomplish them.

The socioeconomic context of fertility decline in West Java has been discussed. In conclusion it can be argued that there is no basis for saying that fertility decline in the province, and probably in other provinces of Java and Bali, has occurred in the absence of significant economic development. Rather, it has occurred in a period of quite rapid economic growth, change in the structure of the economy, and, more importantly, rapid improvement in the living standards of the people. The rapid economic growth in Indonesia in the period 1968-1981, partly as a result of technological progress (especially in agriculture; see Sundrum, 1986: 40), made a great contribution. In contrast,

the current economic situation which 'is difficult but manageable' (Muir, 1986: 27) might adversely influence socioeconomic conditions in West Java and other

Table 4.4: Physical Quality of Life Index (PQLI) and Its Components in Selected Provinces of Java: 1971, 1980 and 1985

Year	West Java	Central Java	Yogya-karta	East Java
		Literacy Rate[1)]		
1971	61	51	49	48
1980	71	62	65	59
1985	82	74	72	69
		Infant Mortality Rate (IMR)[2)]		
1971	159	147	147	133
1980	131	98	63	100
1985	91	73	29	75
		Life Expectancy at Age One (e1)[3)]		
1971	51	52	52	58
1980	54	59	64	59
1985	61	64	69	65
		Physical Quality of Life Index (PQLI)[4)]		
1971	42	41	41	47
1980	52	58	69	57
1985	68	70	80	69

Source: BPS (1974b-e, 1983c-f, 1987d-g, 1988a) and Morris (1979)

Note :1) Literacy rate (percentage) for population aged 15 or above.

2) Per 1,000 life births.

3) Calculated using the formula:

$$e1 = (e0-1+IMR(1-k))/(1-IMR) \quad (k=0.34)$$

4) Calculated using the formula:

$$PQLI = (\text{Literacy rate} + (229-IMR)/2.22 + (e1-38)/0.39))/3$$

provinces as well. Will this affect future fertility levels in that province or is there enough evidence to believe that, once started, fertility decline is an unstoppable process?

CHAPTER FIVE:
SUMMARY AND CONCLUSIONS

Analysis and interpretation of fertility decline in West Java have been undertaken undertaken in this study. Background materials for the study were described in Chapter One. A descriptive analysis of past trends and differentials in fertility was then presented in Chapter Two. In Chapter Three, changes in the crude birth rate (CBR) and its major components were examined, evaluated and compared. Marriage patterns of women in West Java were also discussed in this chapter.

Chapter Four of the study explored the socioeconomic context in which fertility decline in the province has occurred. In this final chapter, a summary and the conclusions of the study are presented.

5.1 Summary Findings

5.1.1.Geographic and Sociocultural Settings

Compared to other provinces of Java and Bali, the geographic setting of West Java is quite distinct. Its location near the capital city, Jakarta, enables West Java to be more cosmopolitan. More importantly, unlike Central and East Java, most of whose regencies are located in lowland areas, the majority (13 out of 20) of regencies in West Java are steep coastal or hilly (upland) areas. Such areas are understood to be mainly responsible for the relatively poor success of family planning programs in the province.

Following Simon's argument (1980) that fertility is a basically a religious practice, the strict Moslems among the Sundanese, the major ethnic group in West Java, could have a different fertility performance from inhabitants of other parts of Java. The processes of

development and 'enlightment' could gradually remove the unfavourable influence of 'strict' Islam in Sundanese society.

While among the Javanese the practices of pre-Islamic culture seem to have a high Hindu content, as reflected in their viewing authority with a 'mystical reverence' (Parsons, 1984: 5), among the Sundanese there seems no historical basis for such a view. The Javanese view is favourable to the acceptance of family planning, even when socioeconomic conditions do not support it (Parsons, 1984: 5).

5.1.2 Trend and Differentials in Fertility

To trace the fertility trend in West Java we can go back to the period 1967-70. To go beyond this period would be speculative since no convincing data source is available for serious analysis (see, for example, Hugo et al., 1987: 40; McNicoll and Singarimbun, 1983: 113).

During the period 1967-70, a woman in West Java was expected to bear, on average, 6.3 children if she survived until the end of her reproductive period. For various reasons, the figure has consistently declined and reached 4.3 in the period 1981-84. This is an annual decrease of 2.7 per cent.

To state this in another way, while in the period 1967-70 about 50 births per 1000 population occurred annually in West Java, in the period 1981-84 the figure was only 35. There seems no sufficient basis to judge whether the province will be able to reach the figure of 22 per 1000 by 1990, the official target for Indonesia. Nonetheless, the figures to date represent a relatively quick decline in fertility in the province. This has been associated with an increase in the prevalence rate of the acceptance of family planning programs and with a rise in age at marriage for younger birth cohorts of women.

A comparison with the fertility of other provinces of Java and Bali indicates a consistently higher level fertility for West Java. A lower age at marriage for women, and lower durations of breastfeeding and postpartum abstinence may largely explain this. An interesting note here is that the fertility level for Bali in the period 1967-70, an era when the Family Planning Programme was not yet officially operating in Indonesia, was very similar to that of West Java, but it had become much lower by the period 1981-84.

Fertility differentials among different societal strata in West Java are shown by the present study. A higher level of fertility is more likely to be found among women who married earlier, among less educated women and among women with higher socioeconomic status. The last differential, using landholding area owned by the household as the measure of status, is not surprising, even though it challenges 'a sociodemographic law' (Wrong, 1966: 71). Some other studies (Hull, 1967; Supraptilah and Soeradji, 1979) have shown similar findings. Examination of different birth cohorts of women shows no difference fertility differentials by age at marriage, education and size of landholding.

5.1.3 Relative Influences of CBR Components

Examination of the influence of major components of the crude birth rate (CBR) on CBR decline in the period 1981-85 indicates both positive and negative effects of these components. Changes in age structure and the proportion of women of childbearing age have negatively influenced CBR decline. This is probably a typical picture for a young, expanding population. These influences, however, were not as important as those of the other major CBR components: female marriage patterns and marital fertility. These have positively influenced CBR decline in the sense that changes in them were

favourable to the decline. The most important influence has been shown by marital fertility. This fact may stimulate us to give credit to family planning programs. Comparison among provinces of Java and Bali indicates only small variations.

5.1.4 Development and Fertility

The study has demonstrated that fertility decline in West Java has occurred in the presence of significant socioeconomic development. Various measures of development such as per capita Gross Regional Domestic Product (GRDP), agricultural production, educational and health services, and living standard (measured by Physical Quality of Life Index (PQLI)), have improved significantly in West Java. Income distribution in the province has been comparatively egalitarian and tended to be more equitable overtime. The above improvements and changes in the structure of the economy (exemplified by, among other things, a decrease in the relative contribution of the traditional sector, agriculture, to gross domestic product) conceivably have been conducive to fertility decline.

5.2 Conclusions

The fertility level in West Java has been consistently declining since the mid-1960s. Yet the fertility level has been quite distinct from those of other provinces of Java and Bali in the sense that it has always been the highest. In addition, fertility differentials among strata of the society are found to follow conventional patterns, with small exceptions.

The study has identified a number of variables that explain these phenomena. They included in these variables are intermediate variables (mean age at marriage, contraceptive prevalence and duration of breastfeeding),

demographic variables (such as infant mortality rate and age structure) and socioeconomic variables (such as educational level, landholding area, and the PQLI). It should be noted here that a more systematic study of the issue using statistical techniques (say, multivariate analysis) might be needed to confirm these conclusions, though there is a strong suggestion that the results would not be different.

The study has speculated that differences in geographic setting, social strata and world view between the Sundanese and the Javanese might also help explain the difference of fertility levels between the two societies. This is, however, a tentative conclusion and calls for further inquiry.

Another tentative conclusion can also be mentioned here. The analysis suggests that low mean age at marriage has high explanatory power for the higher fertility in West Java. It also mentions the strict Moslems among the Sundanese as an explanation. This is a certainly not a proven explanation. Reliable information on such matters as, for example, how young unmarried Sundanese get knowledge of sexual intercourse, their attitude towards promiscuity, and their attitude towards illegitimate offspring would be of interest for policy planners. An anthropological study is needed to obtain such information, in which context the framework of Hassan (1980), modified from Davis-Blake (1956), would be useful.

A more comprehensive study than the one presented here would necessarily include such aspects as the supply of and the demand for children, fertility regulation and its costs, and the effects of social institutions (see Bulatao and Lee, 1983: 788-830). The last aspect seems to be the least understood, even though it possibly has more policy implications.

Following Saigal's argument (1973: 11, cited in Epstein, 1979: 5), that 'the basic problem of social and economic development in the Third World is not demographic but structural', a better understanding of the social structure and its institutions becomes more important. This is especially true for a country which is 'probably the most ethnically and culturally heterogeneous of the world's largest nations' (Hugo et al., 1987: 18). Thus, there is a need to explore the potential of the existing social structures in Indonesia to create the organizational capacity to solve the problem 'of socially excessive population growth' (McNicoll, 1975: 15), as confronted China in the 1950s and in Japan during the late Tokugawa era.

The need becomes urgent if we consider the commitment of the Indonesian government since 1987 to introduce 'Self-supported Family Planning' (KB mandiri) (Suyono, 1988: 60). The commitment should challenge individuals, communities and non-government organizations to play a more important role in the family planning programme (see, for example, Wirosardjono, 1988), while the government's domination would eventually disappear. Needless to say, the commitment should of necessity be supported by more comprehensive studies of social structural aspects of population policy.

Appendix One

STANDARDIZATION APPROACH

This appendix is summarized from "Standardization Approach" (U.N. Secretariat, 1979). Some formulae on joint effect terms have been added to the original. The results of calculations required in the standardization as applied to the data of the provinces of Java and Bali are also presented in this appendix.

1. Quantitative relationship

A crude birth rate (CBR) can be expressed as a multiple of its major components. The basic relationship between the rate and its components is as follow:

$$CBR = B/P \quad \text{.....(1)}$$

where CBR : crude birth rate;
B : number of births; and
P : total population.

From equation (1) emerges:

$$CBR = (B/W).(W/P) \text{.....(2)}$$

where W : number of females of reproductive ages in the population.

Since $GFR = B/W$ .....(3)

where GFR : general fertility rate, then equation (2) becomes:

$$CBR = GFR.\ (W/P) \text{.....(4)}.$$

If it is assumed that all births in the population occur to women classified in the i group, then

$$B = \eth W_i.F_i \quad \text{.....(5)},$$

where F_i : age-specific fertility rate in age group i.

Assuming further that the number of illegitimate births are negligible, then

$$B = \delta N_i . F_{mi} \quad \ldots\ldots\ldots (6),$$

where N_i : number of married women in age group i, and
F_{mi} : marital age-specific fertility rate in age i.

For $N_i/W_i = M_{pi}$ $\ldots\ldots\ldots (7)$,

where M_{pi} : proportion of married women among all women in age group i,

then equation (6) becomes

$$B = \delta W_i . M_{pi} . F_{mi} \ldots\ldots\ldots (8).$$

Replacing equation (8) in equation (1) yields a decomposition of the CBR as follows:

$$\begin{aligned} CBR &= B/P \\ &= (1/P)\ \delta W_i . M_{pi} . F_{mi} \\ &= (W/P)\ \delta (1/W) . W_i . M_{pi} . F_{mi} \\ &= (W/P)\ \delta A_i . M_{pi} . F_{mi} \ldots\ldots\ldots (9), \end{aligned}$$

where $A_i = (W_i/W)$ ...age structure component.

Combining equations (3) and (8) results in

$$\begin{aligned} GFR &= B/W \\ &= (1/W)\ \delta W_i . M_{pi} . F_{mi} \\ &= \delta A_i . M_{pi} . F_{mi} \ldots\ldots\ldots (10). \end{aligned}$$

The last two equations vividly represent the relation between the CBR or GFR and its major components. These equations can be applied to analyze influences of the components on changes in the CBR and GFR during a period after a simple mathematical manipulation.

2. Measurement of changes: Decomposition

The following symbols are used to develop measurements of changes in the standardization approach.

t_1 : initial point in time;
t_2 : end of the time period;
CBR_1 : crude birth rate at time t_1;
CBR_2 : crude birth rate at time t_2;
GFR_1 : general fertility rate at time t_1;
GFR_2 : general fertility rate at time t_2;
i : age group of women in their reproductive ages;
A_{1i} and A_{2i} : age structure components in age group i at time t_1 and t_2 respectively;
M_{1i} and M_{2i} : marital status distribution in age group i at time t_1 and t_2 respectively;
F_{1i} and F_{2i} : age-specific marital fertility rate in age group i at time t_1 and t_2 respectively;
W_1/P_1 and W_2/P_2 : proportion of women to the population at time t_1 and t_2 respectively;

Using the above symbols, the CBR formula for time t_1 and t_2 can be rewritten as follows:

$$CBR_1 = (\delta A_{1i}.M_{1i}.F_{1i}).(W_1/P_1) \quad \ldots\ldots(11), \text{ and}$$
$$CBR_2 = (\delta A_{2i}.M_{2i}.F_{2i}).(W_2/P_2) \quad \ldots\ldots(12).$$

The GFR for time t_1 and t_2 can also be written as follows (see equation 11):

$$GFR_1 = \delta A_{1i}.M_{1i}.F_{1i} \quad \ldots\ldots\ldots\ldots(13), \text{ and}$$
$$GFR_2 = \delta A_{2i}.M_{2i}.F_{2i} \quad \ldots\ldots\ldots\ldots(14).$$

A change in GFR between time t_1 and t_2 then may be formulated as:

$$\begin{aligned}
\check{S}\, GFR_1 &= GFR_2 - GFR_1 \\
&= \delta A_{2i}.M_{2i}.F_{2i} - \delta A_{1i}.M_{1i}.F_{1i} \\
&= \delta[(A_{1i} + \check{S}A_{1i})(M_{1i} + \check{S}M_{1i})(F_{1i} + \check{S}F_{1i}) - \\
&\quad \delta A_{1i}.M_{1i}.F_{1i} \\
&= \delta\, \check{S}A_{1i}.M_{1i}.F_{1i} + \delta A_{1i}.\, \check{S}M_{1i}.F_{1i} + \\
&\quad \delta A_{1i}.M_{1i}.\, \check{S}F_{1i} + [\delta\, \check{S}A_{1i}.\, \check{S}M_{1i}.F_{1i} + \\
&\quad \delta\, \check{S}A_{1i}.M_{1i}.\, \check{S}F_{1i} + \delta A_{1i}.\, \check{S}M_{1i}.\, \check{S}F_{1i} + \\
&\quad \delta\, \check{S}A_{1i}.\, \check{S}M_{1i}.\, \check{S}F_{1i}] \quad \ldots\ldots\ldots(15)
\end{aligned}$$

where $A_{2i} = A_{1i} + \check{S}A_{1i}$
$M_{2i} = M_{1i} + \check{S}M_{1i}$
$F_{2i} = F_{1i} + \check{S}F_{1i}$.

Ignoring, for a while, the role of 'joint' effects, equation (15) can be simplified as follows:

$$\Delta GFR_1 = \delta \Delta A_{1i} \cdot M_{1i} \cdot F_{1i} + \delta A_{1i} \cdot \Delta M_{1i} \cdot F_{1i} + \delta A_{1i} \cdot M_{1i} \cdot \Delta F_{1i} \quad \ldots\ldots\ldots (16).$$

Equation (16) demonstrates that changes in the GFR can be accounted for as a sum of the independent roles of changes in the age structure ΔA_{1i}, in marital status ΔM_{1i} and in marital fertility ΔF_{1i}.

A change in the CBR can be expressed as follows:

$$\begin{aligned} \Delta CBR &= CBR_2 - CBR_1 \\ &= (W_2/P_2)\, GFR_2 - (W_1/P_1)\, GFR_1 \\ &= [(GFR_1 + \Delta GFR_1)(W_1/P_1) + \Delta(W_1/P_1))] - (W_1/P_1) GFR_1 \\ &= GFR_1\, \Delta(W_1/P_1) + \Delta GFR_1\, (W_1/P_1) + \Delta GFR_1\, \Delta(W_1/P_1) \quad \ldots\ldots\ldots\ldots (17) \end{aligned}$$

where $(W_2/P_2) = (W_1/P_1) + \Delta\%(W_1/P_1)$

By substituting equation (15) into equation (17) one obtains:

$$\begin{aligned} \Delta CBR = {} & GFR_1\, \Delta(W_1/P_1) + (W_1/P_1)(\Delta A_{1i} \cdot M_{1i} \cdot F_{1i} + \\ & A_{1i} \cdot \Delta M_{1i} \cdot F_{1i} + A_{1i} \cdot M_{1i} \cdot \Delta F_{1i} + \\ & [(W_1/P_1)\, (\delta \Delta A_{1i} \cdot \Delta M_{1i} \cdot F_{1i} + \delta \Delta A_{1i} \cdot M_{1i} \cdot \Delta F_{1i} \\ & + \delta A_{1i} \cdot \Delta M_{1i} \cdot \Delta F_{1i} + \delta \Delta A_{1i} \cdot \Delta M_{1i} \cdot \Delta F_{1i})] \\ & + [\, \Delta(W_1/P_1)\, (\delta \Delta A_{1i} \cdot M_{1i} \cdot F_{1i} + \\ & \delta A_{1i} \cdot \Delta M_{1i} \cdot F_{1i} + \delta A_{1i} \cdot M_{1i} \cdot \Delta F_{1i}) + \\ & \Delta(W_1/P_1)(\delta \Delta A_{1i} \cdot \Delta\% M_{1i} \cdot F_{1i} + \delta \Delta A_{1i} \cdot M_{1i} \cdot \Delta F_{1i} \\ & + \delta A_{1i} \cdot M_{1i} \cdot \Delta F_{1i} + \\ & \delta \Delta A_{1i} \cdot \Delta M_{1i} \cdot \Delta F_{1i})] \ldots\ldots\ldots\ldots\ldots\ldots (18). \end{aligned}$$

For the sake of simplicity, one can leave out the interaction terms in the equation (18) and obtain:

$$\begin{aligned} \Delta CBR = {} & GFR_1\, \Delta(W_1/P_1) + \Delta(W_1/P_1) \delta \Delta A_{1i} \cdot M_{1i} \cdot F_{1i} \\ & \Delta(W_1/P_1)\, \delta A_{1i} \cdot \Delta M_{1i} \cdot F_{1i} + \\ & \Delta(W_1/P_1)\, \delta A_{1i} \cdot M_{1i} \cdot \Delta F_{1i} \quad \ldots\ldots\ldots\ldots (19). \end{aligned}$$

Using equations (16) and (19), decomposition into factors of changes in the CBR and GFR into factors can be performed using the formulae as presented in Table A1.1. In the formulae, P_1 is used as the base (standard). If P_2 is selected as the standard, the formulae remain unchanged except for an appropriate interchange of subscripts in the factors kept constant.

Table A1.1: Formulae for Decomposition fof Changes in the CBR and GFR into Factors

Factor	Change in CBR	Change in GFR
Age Structure	$(W_1/P_1)\delta(A_{2i}-A_{1i})M_{1i}.F_{1i}$	$\delta(A_{2i}-A_{1i})M_{1i}F_{1i}$
Marital Status	$(W_1/P_1)\delta A_{1i}(M_{2i}-M_{1i})F_{1i}$	$\delta A_{1i}(M_{2i}-M_{1i})F_{1i}$
Marital Fertility	$(W_1/P_1)\delta A_{1i}.M_{1i}(F_{2i}-F_{1i})$	$\delta A_{1i}.M_{1i}(F_{2i}-F_{1i})$
Proportion of women of reproductive ages in the total population	$GFR_1[(W_2/P_2) - (W_1/P_1)]$	-

Source : Equations (16) and (19).

3. Joint effect terms

As mentioned earlier, for the sake of simplicity equation (16) and (19) are derived by ignoring joint effect terms. Influences of the factors on changes in the CBR and GFR as presented in Table A1.1 should therefore be considered as unadjusted.

How much of the joint effects of age structure and marital fertility is to be allocated to age structure and to marital fertility? This calls for an arbitrary assumption. The assumption employed here is that the joint effects are equally allocated to each component.

The joint effect terms in equation (15) are

$$\delta\,\check{S}A_{1i}.\,\check{S}M_{1i}.F_{1i} + \delta\,\check{S}A_{1i}.M_{1i}.\,\check{S}F_{1i} + \delta A_{1i}.\,\check{S}M_{1i}.\check{S}F_{1i} + \delta\,\check{S}A_{1i}.\,\check{S}M_{1i}.\,\check{S}F_{1i}$$

By employing the equality assumption, the term $\delta\check{S}A_{1i}.M_{1i}.\check{S}F_{1i}$, for instance, can be allocated one half to the age structure factor and one half to the marital fertility factor. A similar approach is used with the

other terms. The adjusted influence of each factor on changes in GFR then can be expressed in formulae as shown in Table A1.2.

Table A1.2: Adjusted Influence of Each Factor on Changes in the GFR

Factor	Adjusted Influence
Age Structure	$\delta \check{S}A_{1i}M_{1i}F_{1i} + (1/2)\,\delta\,\check{S}A_{1i}\,\check{S}M_{1i}F_{1i} + (1/2)\,\delta\,\check{S}A_{1i}M_{1i}\,\check{S}F_{1i} + (1/3)\,\delta\,\check{S}A_{1i}\,\check{S}M_{1i}\,\check{S}F_{1i}$
Marital Status	$\delta A_{1i}\,\check{S}M_{1i}F_{1i} + (1/2)\,\delta\,\check{S}A_{1i}\,\check{S}M_{1i}F_{1i} + (1/2)\,\delta A_{1i}\,\check{S}M_{1i}\,\check{S}F_{1i} + (1/3)\,\delta\,\check{S}A_{1i}\,\check{S}M_{1i}\,\check{S}F_{1i}$
Marital Fertility	$\delta A_{1i}M_{1i}\,\check{S}F_{1i} + (1/2)\,\delta\,\check{S}A_{1i}M_{1i}\,\check{S}F_{1i} + (1/2)\,\delta A_{1i}\,\check{S}M_{1i}\,\check{S}F_{1i} + (1/3)\,\delta\,\check{S}A_{1i}\,\check{S}M_{1i}\,\check{S}F_{1i}$
Total	$\delta\,\check{S}A_{1i}M_{1i}F_{1i} + \delta A_{1i}\,\check{S}M_{1i}F_{1i} + \delta A_{1i}M_{1i}\,\check{S}F_{1i} + \delta\,\check{S}A_{1i}\,\check{S}M_{1i}F_{1i} + \delta\,\check{S}A_{1i}M_{1i}\,\check{S}F_{1i} + \delta A_{1i}\,\check{S}M_{1i}\,\check{S}F_{1i} + \delta\,\check{S}A_{1i}\,\check{S}M_{1i}\,\check{S}F_{1i}.$

Source : Equation (15).

In order to obtain adjusted influences of each factor on changes in the CBR, one can separate the terms in equation (18) into terms as presented in Table A1.3. Final formulae for the adjusted influence are shown in Table A1.4.

4. Results of the Calculation

Results of calculations required for the standardization procedure of this study are presented in Table A1.5. For West Java, since two different base population are used (see Table 3.6), additional figures are needed as follows:

$\delta\, A_{1i}.M_{1i}.F_{1i} = 117.3333$
$\delta\, A_{1i}.M_{1i}.F_{1i} = 132.8247$
$\delta\, A_{1i}.M_{1i}.F_{1i} = 148.6576$
$\delta\, A_{1i}.M_{1i}.F_{1i} = 107.2858$
$\delta\, A_{1i}.M_{1i}.F_{1i} = 137.5904$
$\delta\, A_{1i}.M_{1i}.F_{1i} = 121.0336..$

Table A1.3 Individual and Joint Effect Terms for Determining Contributions of Each Factor of CBR to Changes in the CBR

Factor	Effect
Individual Effect Term	
Age Structure (A)	$a_1 = (W_1/P_1)\delta\ \check{S}A_{1i}M_{1i}F_{1i}$
Marital Status (M)	$a_2 = (W_1/P_1)\delta A_{1i}\ \check{S}M_{1i}F_{1i}$
Marital Fertility (F)	$a_3 = (W_1/P_1)\delta A_{1i}M_{1i}\ \check{S}F_{1i}$
Proportion of women of reproductive ages in the total population (W/P)	$a_4 = GFR_1.\ \check{S}(W_1/P_1)$
Joint Effect Term	
A and M	$a_5 = (W_1/P_1)\delta\ \check{S}A_{1i}\ \check{S}M_{1i}F_{1i}$
A and F	$a_6 = (W_1/P_1)\delta\ \check{S}A_{1i}M_{1i}\ \check{S}F_{1i}$
A and (W/P)	$a_7 = (W_1/P_1)\delta\ \check{S}A_{1i}M_{1i}F_{1i}$
M and F	$a_8 = (W_1/P_1)\delta A_{1i}\ \check{S}M_{1i}\ \check{S}F_{1i}$
M and (W/P)	$a_9 = \check{S}(W_1/P_1)\delta A_{1i}\ \check{S}M_{1i}F_{1i}$
F and (W/P)	$a_{10} = \check{S}(W_1/P_1)\delta A_{1i}M_{1i}\ \check{S}F_{1i}$
A and M and F	$a_{11} = (W_1/P_1)\delta\ \check{S}A_{1i}\ \check{S}M_{1i}\ \check{S}F_{1i}$
A and M and (W/P)	$a_{12} = \check{S}(W_1/P_1)\delta\ \check{S}A_{1i}\ \check{S}M_{1i}F_{1i}$
A and F and (W/P)	$a_{13} = \check{S}(W_1/P_1)\delta\ \check{S}A_{1i}M_{1i}\ \check{S}F_{1i}$
M and F and (W/P)	$a_{14} = \check{S}(W_1/P_1)\delta A_{1i}\ \check{S}M_{1i}\ \check{S}F_{1i}$
A and M and F and (W/P)	$a_{15} = \check{S}(W_1/P_1)\delta\ \check{S}A_{1i}\ \check{S}M_{1i}\ \check{S}F_{1i}$

Source: Equation (18).

Table A1.4 Formulae for Decomposition into Factors of Changes in the CBR (adjusted)

Factor	Change in CBR
A	a1 + (1/2)(a5 + a6 + a7) + (1/3)(a11 + a12 + a13) + (1/4)a15
M	a2 + (1/2)(a5 + a8 + a9) + (1/3)(a11 + a12 + a14) + (1/4)a15
F	a3 +(1/2)(a6 + a8 + a10) + (1/3)(a11 + a13 + a14) + (1/4)a15
W/P	a4 +(1/2)(a7 + a9 + a10) + (1/3)(a12 + a13 + a14) + (1/4)a15

Source: Equation (18) and Table A2.3 (for notes)

Table A1.5 The Results of Calculations Required for the Standardization applied to the data of Java and Bali by province

Function	West Java	Jakarta	Central Java	Yogya-karta	East Java	Bali
ðA1iM1iF1i	144.25	132.64	125.39	95.44	103.72	111.20
ðA2iM2iF2i	111.32	75.30	95.64	75.08	83.98	80.35
ðŠA1iM1iF1i	4.41	4.51	3.91	5.20	2.72	0.90
ðA1iŠM1iF1i	-11.43	-17.87	-10.55	-10.99	-6.94	-13.20
ðA1iM1iŠF1i	-26.92	-49.48	-24.36	-15.92	-16.71	-21.45
ðŠA1iŠM1iF1i	0.36	0.46	0.38	0.11	0.43	0.19
ðŠA1iM1iŠF1i	-0.71	-1.55	-0.78	-0.33	-0.34	0.16
ðA1iŠM1iŠF1i	1.38	6.86	1.71	1.64	1.17	2.59
ðŠA1iŠM1iŠF1i	-0.03	-0.29	-0.07	-0.07	-0.08	-0.05

Source/Note: Calculated from BPS (1983c-h, 1987b-g) and Hull(1988, personal communication).

Appendix Two

Some Notes on the Estimation of Fertility Levels

Fertility levels reported in this study are derived from several sources, published or unpublished, as stated in the text. Methods applied in estimating the levels are the Own Children and the Last Birth methods. It is worthwhile to have some broad picture of how accurate these estimations are by considering the natures of the methods.

The Own Children Method

The Own Children method is based on the very simple proposition that the fertility level can be calculated if the age structure and mortality level of the population are known (BPS, 1988: 24). This method has been widely applied to the data of several ESCAP countries since the 1960s (Ogawa, 1980: 65). It is a survey or census-based reverse-survival method.

According to Retherford and Cho (1978, cited in Ogawa, 1980: 66-67), there are four major data requirements to be met before applying the method. These are: (1)that children's ages are reasonably accurate, (2) that most of the children live with their mother, (3) that the relationship of each child to the head of the family is clearly specified, and (4) that mortality levels are relatively low during the estimation period prior to enumeration. While the second and the third requirements are quite reasonable, the other two are less likely to be realistic for Indonesia.

Retherford and Cho (1978, cited in Ogawa, 1980: 66-67) have further pointed out five computational assumptions of the method. These are: (1) the same degree of underenumeration of children aged x as those aged x+1

for any age x of child, (2) the same extent of underenumeration of women aged a as those aged a+1 for any age a of mother, (3) a constant proportion (with respect to age) of non-Own Children, (4) the uniform age distribution of women, and (5) unchanged age-specific mortality.

Ogawa (1980: 79) has claimed that the requirements and assumptions mentioned earlier are 'flexible to a certain extent without influencing ultimate fertility estimate'. However, most of them seem to be less implausible and hard to justify for such poor quality data as Indonesian data.

Another important limitation of the method arises from the possible impact of age misreporting, which is substantial for Indonesian data. As has been reported by Cho et al.(1986: 6), 'both the age pattern of fertility and the estimation trend of fertility can be severely distorted by age misreporting'.

The Last Birth Method

This is a direct method in the sense that the numerator (number of births) of the fertility measure is directly obtained from census or survey results with a very simple adjustment. As a direct method it is free of assumptions which are inherent in an indirect method, such as constant fertility and mortality prior to the enumeration (the conditions of stability). Such assumptions are likely to be unrealistic for Indonesia.

The major assumption of this method is that 'the fertility levels at the end of the year are the same as those prevailing at the beginning of the year' (Hull and Dasvarma, 1987: 2). It is evident that only a minor departure from this assumption would be expected.

Adjustments are needed in the calculation regarding multiple births and the allocation of "not stated"

responses. The allocation of non-responses (found in the 1980 census data) can use open interval or pro rata methods (Hull, personal communication). In this thesis, the former was selected.

The sources of reporting error which potentially affect the calculation have been discussed by Hull and Dasvarma (1987:2). They claim that none of the sources 'is particularly likely to have affected the SUPAS [the 1985 survey] results'.

Misclassification of the ages of women of reproductive age can also affect the accuracy of results of the method. An examination of age-specific fertility rates in 1975 calculated by Hull (personal communication) based on the 1976 Intercensal Survey data provides an unreasonable mean age of childbearing. As an illustration, the mean age of childbearing for Central Java according to Hull's calculation is 35.9 years in 1975 as compared to 27.9 years if the 1985 data are used.

Another Method

Brass has developed a popular method of estimating the fertility level by combining mean parity (P) and current fertility (F). While P is based on respondents' reports about their number of children ever born at the time of a survey, F is based on their reports about current fertility. In this thesis F is obtained by applying last births method.an indirect method .The P/F method has three major assumptions. These are: (1) misstatement of the reference period is not related to age (accept age pattern of current fertility), (2) number of children ever borne is better reported by younger than older women (accept level of fertility of younger women) , and (3) the mean parity (P) data assume stability (constant fertility) (Brass and Coale, 1968: 91; Brass, 1975: 18-23; Hull, 1988b: 2).

Application of this method to the data of West Java provides unsatisfactory results especially for 1985. Table A2.1 shows this clearly (ASFRs based on the last birth method are treated as unadjusted ASFRs in the calculation.)

There are three important points shown in the table. First, current fertility was poorly reported or parity was overreported as can be seen from P/F ratios which are larger than one. (In the circumstance where both P and F are accurately reported, P/F should equal to one.) It is not known exactly which is more likely to occur and this is a general weakness of the method. However, looking closely at the ratios and accepting the possibility of memory lapse which tends to increase by age, it seems that the second alternative, over-reported parity, is less likely to happen. Accordingly, one may speculate that current fertility was poorly reported. This problem seems to be more serious in the 1985 data.

Table A2.1: P/F Ratios and Age-Specfic Fertility Rates (ASFR) for West Java: 1980 and 1985

Age Group	1980		1985	
	P/F	ASFR	P/F	ASFR
15 - 19	2.060	0.139	3.576	0.096
20 - 24	1.196	0.275	1.614	0.246
25 - 29	1.136	0.244	1.376	0.233
30 - 34	1.196	0.188	1.369	0.189
35 - 39	1.125	0.126	1.428	0.100
40 - 44	1.235	0.053	1.476	0.041
45 - 49	1.230	0.016	1.469	0.012

Source: Calculated from BPS (1983c, 1987d) and Hull(personal communication).

Second, compared to the other two methods covered, the P/F ratio method provides much higher TFR figures. Finally, the method still indicates the fertility decline in West Java.

To sum up, fertility levels reported in this study which were obtained by applying the Own Children and the Last Birth methods are likely to be more accurate than those which would be obtained using the P/F method. As reported by Hull (1988b: 4), 'application of standard P/F adjustments will not improve fertility estimates; on the contrary errors will be compounded'.

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