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FERTILITY AND FAMILY PLANNING BEHAVIOR
IN THE BICOL RIVER BASIN

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FERTILITY AND FAMILY PLANNING BEHAVIOR
IN THE BICOL RIVER BASIN

Alejandro N. Herrin*

INTRODUCTION

The Bicol region, consisting of six provinces (two of them separate islands) is located at the southern tip of Luzon. In 1975, it had a total population of 3.2 million, or 8 percent of the national population. The region is one of the least developed areas of the country. Moreover, it is one of the regions with the highest fertility, infant mortality and rate of out-migration. In view of these characteristics, serious efforts have been undertaken to accelerate the development of the region.

In order to provide a greater understanding of the long-term impact of development efforts in the area, the first Bicol Multi-purpose Survey (BMS) in what is to be a series of surveys at appropriate intervals, was conducted in 1978. One of the key areas of interest for planning in the region is its demographic development. One aspect of this relates to the levels, trends and determinants of fertility and family planning practice. This paper reports on the analysis of fertility and family planning behavior in the Bicol River Basin based on the data obtained from the 1978 BMS.

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This paper is organized as follows. Section II describes salient economic-demographic characteristics of the region in the context of national trends. Section III describes the demographic data collected by the 1973 BMS. Section IV presents tabulations of major demographic parameters by selected socioeconomic characteristics. Section V presents the analytical framework for examining the determinants of fertility and family planning practice. Section VI presents the regression results. The last section concludes.

ECONOMIC-DEMOGRAPHIC CHARACTERISTICS

The Bicol region had a population of 3.2 million in 1975, constituting 8 percent of the national population. The region's land area comprises 7 percent of the national territory. Selected socioeconomic indicators shown in Table 1 suggest that the region is one of the poorest in the country. It ranked second from the bottom of 13 regions in terms of per capita regional output in 1977 and average family income in 1975, and was fourth highest in terms of poverty incidence in 1975. In terms of level of urbanization, it ranked fourth from the bottom in 1975. As a rough indicator of infrastructure development, it had the lowest road density in 1975 among all regions.

The depressed socioeconomic conditions in the region are related to its demographic performance. See Table 2. The total fertility rate estimated at around 1975 was the highest in all regions, while the percent decline in total fertility rate from

Table 1

SELECTED SOCIOECONOMIC INDICATORS BY REGION

Region	Population 1975 ^{a/} (millions)	Land Area (sq. km.) ^{a/} (000)	Per Capita Output, 1977 (₱000) ^{b/}	Average Family Income 1975 ^{a/} (₱)	Poverty Incidence, 1975 ^{c/} (percent)	Percent Urban, 1975 ^{d/}	Road Density (km./sq. km. of alienable land) 1975 ^{b/}
Philippines	42.1	300.0	1,733	5,840	45.3	33.4	0.68
Luzon							
Bicol	3.2	17.6	906	4,280	55.5	18.4	0.34
Ilocos	3.3	21.6	1,058	5,575	38.5	21.1	1.12
Cagayan Valley	1.9	36.4	1,072	5,102	45.6	13.9	0.49
Central Luzon	4.2	18.2	1,379	5,773	28.9	33.9	0.67
Southern Tagalog	5.2	46.9	1,694	7,775	45.9	31.8	0.58
Metro Manila	5.0	0.6	4,474	10,469	30.9	100.0	4.41
Visayas							
Western Visayas	4.1	20.2	1,933	5,484	48.0	26.7	0.44
Central Visayas	3.4	15.0	1,405	5,172	59.9	28.9	0.91
Eastern Visayas	2.6	21.4	935	4,834	56.0	18.7	0.49
Mindanao							
Western Mindanao	2.0	18.7	1,014	5,662	45.9	14.9	0.40
Northern Mindanao	2.3	28.3	1,275	3,803	72.8	23.2	0.92
Southern Mindanao	2.7	31.7	1,769	6,307	41.5	26.7	n.a.
Central Mindanao	2.1	23.3	905	5,025	31.7	15.5	n.a.

SOURCES: ^{a/} NEDA, 1981 Philippine Statistical Yearbook, Manila, 1981.

^{b/} NEDA, Five-Year Philippine Development Plan, 1978-1982, Manila, 1977.

^{c/} World Bank (1980).

^{d/} Pernia and Paderanga (1981; Table 4).

Table 2

SELECTED DEMOGRAPHIC INDICATORS BY REGION

Region	TFR 1973-77 ^{a/}	Percent Change in TFR ^{a/} 1958-62 to 1973-77	IMR (q) 1970 ^{b/}	Life Expectancy 1970 ^{b/}	Net Migration Rates	
					1960-70 ^{c/}	1970-75 ^{d/}
					(Per 1,000 Population)	
Philippines	5.20	-19.5	93.1	59.3		
Luzon						
Bicol	6.03	-13.1	99.1	55.7	-34	-10
Ilocos	4.90	-23.0	87.9	57.6	-60	-13
Cagayan Valley	5.41	-23.8	103.2	53.0	+16	-2
Central Luzon	4.47	-30.2	82.7	60.2	-20	+6
Southern Tagalog	4.79	-24.9	75.2**	59.5**	+120	+4
Metro Manila	3.11	-38.6	-	-	-193***	+15
Visayas						
Western Visayas	5.04	-20.2	99.1	57.4	-64	-4
Central Visayas	4.70	-21.8	85.6	59.1	-97	-11
Eastern Visayas	5.81	-15.4	97.5	53.0	-84	-2
Mindanao						
Western Mindanao	4.99	-35.8*	131.9*	47.6*	+32*	-11
Northern Mindanao	5.76	-21.7*	135.1*	50.0*	+58*	+16
Southern Mindanao	5.41	-26.0*	111.6*	49.8*	+109	+10
Central Mindanao	5.22	-	-	-	-	-9

SOURCES: a/ de Guzman (1977) for 1958-1972 figures based on 1968 and 1973 NDS; de Guzman (unpublished) for 1973-77 based on 1978 RPPS. TFR stands for total fertility rate.

b/ Flieger, W., et al. (1981). Estimates are for both sexes. Infant mortality rates (IMR) are measured in terms of probability of dying from birth to age one.

c/ Flieger, W., et al. (1976).

d/ NCSO (1981).

* Old regional classification.

** Includes Metro Manila.

*** City of Manila only.

around 1960 to 1975 was the lowest. Mortality rates as measured by the infant mortality rate and the life expectancy at birth are still high relative to the advanced regions of Central Luzon and Southern Tagalog, although not as high as in the Mindanao regions. The depressed conditions in the region is related to large-scale out-migration. Bicol, together with the Ilocos and Visayan regions have been consistent net-out migration regions.

DEMOGRAPHIC DATA IN THE 1978 BICOL MULTIPURPOSE SURVEY (BMS)

The Bicol Multipurpose Survey was designed, among others, to provide information necessary for the systematic assessment of the impact of development efforts in the region under the Bicol River Basin Development Program (BRBDP) of the government. Among the areas of concern addressed by the survey included agricultural production and productivity; levels and distribution of income; time allocation and employment; fertility, mortality, and family planning use; health and nutritional status; contribution of women; and the perceived and objective quality of life. This section describes the demographic data contained in the 1978 BMS.

Fertility. Two types of fertility data can be derived from the survey, namely: the number of children ever born and the number of children born during the last five years, 1973-1977. We describe below the procedures in which these data were obtained by the 1978 BMS and indicate potential threats to their reliability.

Reasonably accurate data on total number of children ever born can usually be obtained from a carefully collected pregnancy histories of ever-married women. The procedure involves intensively questioning each ever-married woman in the household regarding all her pregnancies that terminated either into a live birth or a non-live birth; and in the case of the first category, whether the child is still alive or not. Specific information on each of these types of pregnancies are then obtained, e.g., age and sex of child and whether still living in the household or not. For those children who have died, additional information on age at death is obtained. Where pregnancy intervals are long, e.g., more than three years, respondents are encouraged to recall possible omissions.

A less intensive approach to collecting children ever born data would be to simply ask the respondent to list down all children born alive and still surviving, all children born alive but are now dead, and all children born alive but are now living elsewhere. This approach attempts to improve upon the single question approach on total number of children ever born used by censuses in the past. Nonetheless, without the intensive probing required in obtaining a complete pregnancy history, chances are high in the latter approach for respondents, especially older women, to omit or fail to recall children born alive but who have either died early in infancy or who have since left home. As a consequence, the children ever born data for older women may tend to be understated.

The 1978 BMS did neither of the above approaches for obtaining children ever born data, that is, in the 1978 BMS, no direct questions on children ever born were asked. Instead, the respondent, who was the spouse of the household head, was asked to list all household members including own children, alive or dead. The own children data was then expected to provide the children ever born information. The potential problem with this indirect approach to gathering children ever born data is that the chances are high that older women will fail to include a child as a member of the household if, either the child has died some years back, or the child has already left the household. For younger women, the problem may not be as serious since these women would usually have a smaller number of children, and these children would still be young and mostly likely to be still living in the household with their mothers. Whether in fact children ever born data obtained by the 1978 BMS through the household listing mechanism will be underestimated for older women, of course, remain to be seen. Rough checks for possible underreporting will be made below.

Another feature of the children ever born data in the 1978 BMS is the fact that children reported in the household roster refer only to own children of the household head's spouse or the woman respondent herself if she is the household head. The children of other ever-married women in the household were not coded in relation to their own mothers, hence the number of children ever born of these other women in the household cannot be obtained.

The data on children therefore refer only to children of ever-married women who are either the spouses of household heads or are household heads themselves, and not to all ever-married women in the household. This limits the comparability of the 1978 BMS data with data from other surveys that do obtain data on children of all ever-married women in the household. Nonetheless, this omission is probably not crucially important in terms of the main purpose of the BMS which is to analyze the determinants of demographic behavior rather than to estimate regional fertility levels as such.

The second type of fertility data referred to earlier is the number of children born during the past five years, 1973-1977. This information was obtained by the use of a restricted pregnancy history in which respondents were asked for each year from 1973 to 1977 whether they were pregnant, and if so, how the pregnancy terminated.^{*/} Note that the questions were phrased in terms of "Were you pregnant last year?", "How many times were you pregnant during the preceding four years, in 1976?, 1975?, 1974?, 1973?". A follow-up question on pregnancy termination (i.e., live birth, still birth, or miscarriage) was then asked of each pregnancy. Can women in general accurately recall pregnancies as pregnancies, or can they recall pregnancies better if these were related to specific live births during the past five years? Secondly, even if they can recall all pregnancies, would they voluntarily report all such pregnancies?

^{*/} Additional questions on pre-natal, delivery and child care were also asked.

If indeed women can better recall pregnancies that terminated as live births than just any pregnancy, then the number of reported pregnancies during the past five years will tend to be understated in this survey. Furthermore, even if they can recall all pregnancies, it is possible that they may not report those pregnancies that terminated as still births or miscarriages for the simple reason that they may not want to talk about such experiences, especially if they were emotionally traumatic ones, to interviewers who are strangers to them. Again this will tend to underestimate pregnancies and may affect any contemplated analysis of pre-natal care. This problem of pregnancy recall and reporting, however, may not affect the data on live births since the pregnancies that would tend to be recalled and reported will be precisely those that terminated as live births.

There is a potentially serious source of error with respect to live births, however. This error is related to the time reference in which pregnancies (and live births) are to be reported.^{*/} Pregnancies (live births) may be reported as occurring within the period 1973-1977 when in fact they occurred outside this reference period; if so, the total number of births will be overestimated for the period. On the other hand, pregnancies (live births) actually occurring during the reference period may be mistakenly thought of by respondents as occurring outside the reference period; as a

^{*/}Errors due to misplacement of births occurring in each year are even more likely and, therefore, we consider only the lesser problem of event misplacement for the five year period.

consequence, the number of live births for the period would be understated. The latter type of error has been found by demographers to be more likely in cases where the reference period is 12 months. We do not have information on what direction the error in the aggregate will take if the overall reference period is five years.

Furthermore, demographers assume that in the case of the 12 months reference period, the reporting error does not vary with age of woman. This appears to be a reasonable assumption since the reference period is short enough so that neither younger nor older women would have great difficulty in determining whether a recent birth occurred within the reference period. Whether this assumption can reasonably apply to multiple reference periods encompassing five years remains to be seen. Younger women who are in the early or middle stages of building their families will tend to have most of their pregnancies (births) during the recent past. Hence, these women will have a harder time figuring out whether a pregnancy (birth) occurred in any specific year within the five-year period. It is possible that they would either bunch up their pregnancies during the five-year period or that some pregnancies may be pushed farther back in time beyond the reference period. On the other hand, older women who either have completed their fertility or were in the final stages of completing their family size in the past five years will tend to have fewer pregnancies to remember than the former group of younger women. They will, therefore, tend to have less errors in reporting pregnancies (births) as occurring within the

reference period. Thus, it is possible that errors arising from the failure of women to correctly report pregnancies (live births) as occurring within the reference period under consideration could vary well vary significantly by age of woman and by stage in the reproductive life cycle. In the next section, we shall examine whether these potential errors are reflected in the 1978 BMS data.

Mortality. Direct mortality information was obtained by the 1978 BMS. This information refers to deaths to any member of the family during the past 12 months. Likewise, mortality information can be obtained indirectly from the household roster of children who have died among children ever born.

Data on the proportion of children surviving out of children ever born by age of ever-married women have been used by demographers to estimate Brass-type infant and childhood mortality rates. However, in the 1978 BMS data, only children ever born and children surviving of women who are either the spouse of the household head or the household head herself can be extracted from the roster. The children of other ever-married women cannot be so determined as described earlier. Hence, estimates of Brass-type infant and childhood mortality rates from the 1978 BMS may not correctly measure mortality conditions in the region unless the children ever born and children surviving of women whose data are available from the survey are more or less the same as those women whose data are not available.

On the other hand, the direct mortality information available may not be adequate in providing reliable mortality measures, especially for adult mortality. One major reason is that the base population is relatively small (i.e., 1,903 households multiplied by approximately 6 members per household yields only a population of 11,418, which is too small for reliable estimation of age-specific death rates). Furthermore, direct mortality information can be seriously underestimated even in well designed surveys for the simple reason that respondents may not want to talk about deaths in the family, especially to interviewers whom they hardly know, and hence are unlikely to report such deaths. (See Madigan, et al., 1976).

While the estimation of mortality parameters as such is beyond the scope of this report, we are interested in some measure of child mortality as a potential determinant of fertility. The data on the number of children surviving out of children ever born should be adequate for our present purposes.

Migration. Data on in-migration were obtained from questions on how long the family has lived in the barangay, and if less than five years, where the head of the household previously resided. Data on out-migration, perhaps the more interesting information from Bicol's standpoint, can be inferred from the question on whether a member of the respondent's immediate family (spouse or children) lived in the house during the past six months preceding the interview. However, for family members who were absent during

the past six months, no additional data on current residence and reason for their absence were obtained. In addition, the residence question was restricted to family members only. More seriously, the out-migration of entire households would obviously not be captured by this single survey. Comparison of households in the 1978 BMS with the results of the 1983 BMS currently being fielded should offer interesting data on population mobility. Life mortality, migration analysis is beyond the scope of this paper.

Family Planning. Information on family planning behavior include knowledge of family planning methods and source of this knowledge, ever use and current use of specific methods, and knowledge of family planning clinics, their distance and cost of travel. In addition, respondents were queried on whether or not they have ever been visited by family planning or government personnel who discussed family planning with them, and whether or not they themselves have ever visited a family planning clinic.

Other Fertility Related Information. The 1978 BMS obtained information on whether or not respondents wanted additional children as well as of their desired number of children if they were to start all over again. The second question asks women to respond on the basis of a hypothetical situation. The high correlation between actual and desired family size which is observed both in the Philippines and elsewhere may mean that women do act upon their fertility desires, and that those who desire large families tend to produce

them. If this is true, then desired family size would be a sensitive indicator of demand for contraception, all things being equal. However, the validity of such an interpretation may be questioned on the grounds that it is too difficult for a respondent to isolate herself from actual family circumstances. As a consequence, the respondent may report a large desired family size to rationalize the number of children already born but not planned. (Herrin and Pullum, 1981).

The data on currently married women by family size who state they want no more children may be more informative as an indicator of family size preferences at least given present circumstances because it is not affected by rationalization and it requires less abstraction.

Data on marriage patterns are revealed by information on age at marriage of ever-married women, as well as by information on the marital status of women 15 years and over.

The growing interest in the effects of intermediate variables on fertility has led to a number of studies which examined the effect of breastfeeding on the length of birth intervals, and hence on over-all fertility. In the 1978 SMS, however, breastfeeding information was not obtained in relation to pregnancy or birth intervals. Rather, the breastfeeding information was asked only of living children born during the past two years. The emphasis, it appears, was more on breastfeeding's link with the nutritional

status of the living child, rather than on its potential effect on birth intervals.

The amount of demographic information that were collected by or can be extracted from the survey, with its various limitations, defines the type and depth of analysis that can be made. Needless to emphasize at this point that, given the need to obtain as comprehensive a set of information as possible on many other, and perhaps even more important concerns of the BMS, and given cost and time constraints, the demographic data that could feasibly be collected from this survey could not have the same range and detail as those usually obtained from surveys designed solely to measure fertility and family planning use. Nevertheless, as the last section of this report will suggest with the benefit of hindsight, and the accumulated demographic survey experience, that modifications both in analytical objectives and in data collection procedures could significantly improve the cost-effectiveness of the BMS demographic survey module.

FERTILITY AND FAMILY PLANNING: AN OVERVIEW AND ASSESSMENT

Children Ever Born and Children Surviving. Table 4 presents the data on children ever born and proportion of children surviving of children ever born. The data are classified by age of woman, by selected areal characteristics and by the characteristics of the woman and her household, i.e., her educational attainment, work

status and type of housing construction. The latter characteristic proxy for the income variable.*/

Before presenting the results, we first examine the children ever born data for potential underreporting. A rough check can be made by looking at the data on the proportion of children surviving out of children ever born. If these proportions are too high relative to what might be expected on the basis of independent Philippine studies, then the children ever born data from this Bicol survey could very well be understated, reflecting the tendency for women to underreport children who have died long ago or have since left home in the listing of household members.

Data on children ever born and proportion surviving for Bicol, Misamis Oriental and for the country as a whole are shown in Table 3. Note the definition of ever-married women are not strictly comparable.

First, as one may readily observe, the proportions surviving of children among rural Bicol women compared to rural Misamis Oriental women tend to be higher in all ages except the first two youngest ages. In 1970, the average mortality conditions in Misamis Oriental and the Bicol region are not very different, with life expectancy at birth being 56 years in Bicol and 55 years in Misamis Oriental, and

*/Estimates of household income, the subject of a separate study on the BMS data could not as yet be incorporated in the present analysis.

Table 3

MEAN NUMBER OF CHILDREN EVER BORN OF EVER-MARRIED WOMEN AND PROPORTION
SURVIVING OF CHILDREN EVER BORN: BICOL, RURAL MISAMIS ORIENTAL,
AND PHILIPPINES

	<u>Mean Number of Children Ever Born of Ever-Married Women</u>							
	<u>Total</u>	<u>15-19</u>	<u>20-24</u>	<u>25-29</u>	<u>30-34</u>	<u>35-39</u>	<u>40-44</u>	<u>45-49</u>
Bicol (1978) ^{a/}	5.60	(1.00) ^{d/}	2.01	3.33	4.79	6.34	7.66	8.11
Rural Bicol (1978) ^{a/}	5.66	(1.11) ^{d/}	2.03	3.33	4.31	6.42	8.07	8.58
Rural Mis. Or. (1972) ^{b/}	-	0.76	2.18	3.89	5.33	7.03	7.43	8.17
Philippines (1978) ^{c/}	4.58	0.85	1.89	2.96	4.27	5.66	6.74	7.00
	<u>Proportion Surviving of Children Ever Born</u>							
Bicol (1978) ^{a/}	.89	(.91) ^{d/}	.90	.91	.91	.89	.88	.88
Rural Bicol (1978) ^{a/}	.89	(.90) ^{d/}	.91	.92	.91	.88	.87	.86
Rural Mis. Or. (1972) ^{b/}	-	.99	.93	.91	.90	.87	.84	.82
Philippines (1978) ^{c/}	.90	.93	.93	.92	.92	.90	.88	.87

^{a/} Based on the 1978 BMS. Refers only to ever-married women who are spouses of household heads or are household head themselves.

^{b/} Based on survey in rural Misamis Oriental in 1972. Refers to all ever-married women in the households who gave self-reports (excludes proxy-reported women). See Madigan, *et al.* (1974).

^{c/} Based on the 1978 Republic of the Philippines Fertility Survey (RPFS). Refers to all ever-married women in the households, presumably all were self-reports.

^{d/} Less than 20 cases.

the probability of dying before age 1 being 0.10303 and 0.09906, respectively. (Fliieger, et al., 1981). One would therefore expect the differentials in proportion surviving of children ever born especially of older women to be much closer. Thus, it would appear that the children ever born data for rural Bicol might be understated most particularly for older women.

Secondly, the proportion surviving of children ever born among all Bicol women age 45-49 years tends to be higher than that of the national sample. Since mortality rates in Bicol are expected to be higher than the national average over the past decade, one in fact should expect the reverse to be the case. Moreover, the proportions surviving for Bicol women age 35 years and over should likewise be expected to be somewhat lower than the national average. Thus, there are indications that the number of children ever born derived from the household listing of family members are underreported especially for older women. However, the level of underreporting do not appear to be large enough to affect our conclusions regarding the overall levels and patterns of children ever born by age of woman. This may not be true, however, if we wish to compare sub-group differentials of children ever born by age of woman. As Table 4 shows, the pattern of proportions surviving of children ever born by age of woman tends to be erratic in several specific sub-groups of women. This is probably due to the small sample sizes within sub-groups. In spite of this problem, it is still instructive to examine sub-group differentials aggregated

Table 4

MEAN NUMBER OF CHILDREN EVER BORN (CEB), AND PROPORTION SURVIVING OF CHILDREN
EVER BORN (PS), BY AGE OF WOMAN, BY PROVINCE, AND BY LOCATION, AND
SELECTED CHARACTERISTICS OF THE WOMAN, BICOL RIVER BASIN, 1978

Age of Woman	Province						Location			
	All Women		Camarines Sur		Albay/Sorsogon		Rural		Urban/Poblacion	
	CEB	PS								
15-19	(1.00) ^{a/}	(0.90) ^{a/}	(1.20) ^{a/}	(0.83) ^{a/}	(0.83) ^{a/}	(1.00) ^{a/}	(1.11) ^{a/}	(0.90) ^{a/}	(0.50) ^{a/}	(1.00) ^{a/}
20-24	2.01	0.90	2.03	0.89	1.98	0.91	2.03	0.91	1.91	0.88
25-29	3.33	0.91	3.37	0.90	3.27	0.92	3.33	0.92	3.33	0.87
30-34	4.79	0.91	4.49	0.90	4.64	0.92	4.81	0.91	4.74	0.91
35-39	6.34	0.89	6.49	0.90	6.12	0.89	6.42	0.88	6.17	0.91
40-44	7.66	0.88	7.56	0.87	7.80	0.89	8.07	0.87	6.72	0.89
45-49	8.11	0.88	8.10	0.86	8.12	0.91	8.58	0.86	7.21	0.90
Total (u) ^{a/}	5.60	0.89	5.65	0.90	5.54	0.90	5.66	0.89	5.48	0.90
Total (s) ^{c/}	5.60		5.56		5.55		5.78		5.23	
n	1,257		759		498		893		364	

^{a/} Less than 20 cases.

^{b/} Unstandardized.

^{c/} Age-standardized against all women age distribution.

Table 4 (cont.)

Age of Woman	Education ^{a/}				Work Status ^{b/}				Housing Index ^{c/}			
	0-7 Years		8+ Years		Working		Not Working		Light		Medium/Heavy	
	CEB	PS	CEB	PS	CEB	PS	CEB	PS	CEB	PS	CEB	PS
15-19	(1.00) ^{a/}	(0.89) ^{a/}	(1.00) ^{a/}	(1.00) ^{a/}	(0.67) ^{a/}	(1.00) ^{a/}	(1.12) ^{a/}	(0.89) ^{a/}	(0.87) ^{a/}	(1.00) ^{a/}	(1.33) ^{a/}	(0.75) ^{a/}
20-24	2.06	0.89	1.85	0.94	1.83	0.91	2.13	0.90	2.03	0.90	(1.83) ^{a/}	(0.91) ^{a/}
25-29	3.50	0.90	2.95	0.92	3.33	0.90	3.33	0.92	3.44	0.90	3.09	0.92
30-34	5.06	0.90	3.98	0.94	4.83	0.92	4.73	0.90	5.03	0.90	4.42	0.92
35-39	6.68	0.89	5.04	0.90	6.34	0.89	6.35	0.90	6.72	0.87	5.89	0.93
40-44	8.27	0.87	5.72	0.89	7.59	0.88	7.79	0.86	8.27	0.85	6.78	0.92
45-49	8.52	0.86	6.58	0.95	7.94	0.87	8.48	0.90	8.27	0.85	7.92	0.90
Total (u) ^{b/}	5.99	0.88	4.41	0.92	5.79	0.89	5.33	0.89	5.59	0.87	5.60	0.92
Total (s) ^{c/}	5.93		4.52		5.55		5.69		5.83		5.21	
n	952		305		753		504		767		486	

^{a/} Less than 20 cases.

^{b/} Unstandardized.

^{c/} Age-standardized against all ever-married women age distribution.

for all ages of women since errors will be minimized in the averaging process. As a consequence, the differentials between sub-groups might still be preserved.

Data shown in Table 4 reveal higher mean number of children ever born of women (standardized for age distribution of all women) in Camarines Sur than in Albay/Sorsogon (5.6 vs. 5.5); in rural than in urban or municipal poblacion (5.8 vs. 5.2 and 5.3, respectively); with 7 or less years of education than with 8 years or more (6.0 vs. 4.6); who are non-working than working (5.7 vs. 5.5); and in lower than in higher economic status as proxied by the type of housing construction (5.9 vs. 5.3). These differentials are in the direction expected and is broadly consistent with the Bicol data from the 1979 and 1980 Area Fertility Surveys shown in Table 5 and with the national data shown in Table 6.^{*/}

^{*/} The sample sizes of the Area Fertility Surveys were approximately 4,000 households for each survey round.

Table 5

MEAN NUMBER OF CHILDREN EVER BORN OF ALL EVER-MARRIED
WOMEN AGE 15-54, AREA FERTILITY SURVEYS OF 1979
AND 1980, BICOL REGION

<u>Age of Woman</u>	<u>1979</u>	<u>1980</u>	<u>Residence</u>	<u>1979</u>	<u>1980</u>
15-19	0.83	1.39	Rural	5.27	5.26
20-24	1.90	2.00	Semi-urban	4.85	4.98
25-29	3.32	3.34	Urban	4.58	4.71
30-34	4.70	4.63			
35-39	6.24	6.01	<u>Education</u>	<u>1979</u>	<u>1980</u>
40-44	6.91	7.59	No Schooling	6.96	5.97
45-49	3.11	7.13	Elementary	5.55	5.61
50-54	3.04	7.51	High School or Vocational	3.95	4.19
			College +	3.71	3.58
<u>All Women</u>	5.19	5.20	<u>Socioeconomic Status</u>	<u>1979</u>	<u>1980</u>
			Low	5.29	5.31
			Middle	4.58	4.70
			High	4.69	4.79

SOURCE: Concepcion, M.B. and J. Cabigon (1982), pp. 87-88.

Table 6

MEAN NUMBER OF CHILDREN EVER BORN OF ALL
EVER-MARRIED WOMEN AGE 15-49; 1978
REPUBLIC OF THE PHILIPPINES
FERTILITY SURVEY

<u>Age of Woman</u>		<u>Region of Residence</u>	
15-19	0.85	Metro Manila	3.58
20-24	1.89	Luzon	4.79
25-29	2.96	Visayas	4.71
30-34	4.27	Mindanao	4.61
35-39	5.66		
40-44	6.74		
45-49	7.00		
All Women	4.58		
		<u>Type of Residence</u>	
		Urban	5.15
		Rural	6.04
<u>Level of Education</u>		<u>Husband's Occupation</u>	
No schooling	5.81	Professional	3.65
Primary	5.71	Clerical	3.39
Intermediate	4.62	Sales	4.13
High School	3.83	Self-empl. Agri.	5.09
Some College	2.76	Non self-empl. Agri.	4.97
College w/ degree	3.10	Skilled	4.39
		Unskilled	4.61

SOURCE: 1978 RPFS

Fertility During the Period 1973-1977. The mean number of live births by age of woman during the period 1973-1977 obtained from the abridged pregnancy history information are shown as Estimate A in Table 7. The sample of women include only those who were married continuously during the interval, i.e., currently married women, married in 1972 or before. The data are shown with comparable data for the Philippines as obtained by the 1973 RPFS. It may be readily observed that for Bicol the mean live births to younger women, i.e., 20-24 and 25-29 years, appear too low compared with what might be expected on the basis of the age pattern of recent fertility shown by the Philippine data. Did younger Bicol women actually have lower fertility during the 1973-77 period than the national average, or do the data indicate under reporting by younger women in Bicol? The second possibility appear more plausible when we consider the data in Table 8. This table presents estimates of age-specific fertility rates for all women in Bicol and the Philippines obtained from the 1979 Area Fertility Survey (AFS) and the 1978 RPFS, respectively. The rates are average rates centered in 1975. The AFS rates are averages for 1974, 1975 and 1976 rates, while the RPFS rates are averages for single years from 1973 through 1977. Consider first the age-specific fertility rates for all women. As might be expected, the fertility rates for Bicol would tend to be higher than the national average. The age-pattern of Bicol rates are consistent with the national pattern. Unfortunately, we can not estimate age-specific fertility rates for all women in Bicol from the 1978 BMS

Table 7

MEAN NUMBER OF LIVE BIRTHS DURING 1973-1977 TO WOMEN
CONTINUOUSLY MARRIED DURING THIS INTERVAL:
BICOL AND THE PHILIPPINES

Age Five Years Ago	Current Age	Births in the Past Five Years, 1973-1977		
		Bicol		Philippines ^{c/}
		A ^{a/}	B ^{b/}	
10-14	15-19	-	-	(1.51) ^{d/}
15-19	20-24	1.72	2.19	2.17
20-24	25-29	1.77	2.11	1.83
25-29	30-34	1.47	1.82	1.44
30-34	35-39	1.28	1.58	1.18
35-39	40-44	0.98	1.16	0.75
40-44	45-49	0.48	0.47	0.28
All Women		1.19	1.43	1.20
n		1,042	1,042	7,239

^{a/} From the 1978 BMS based on data from the abridged pregnancy history.

^{b/} From the 1978 BMS based on data on children born during 1973-1977 period as recorded in the household list.

^{c/} NCSO, et al. (1979; Table 5.10) from the 1976 RPFS.

^{d/} Less than 20 cases.

Table 8

ESTIMATES OF AGE-SPECIFIC FERTILITY RATES, ALL WOMEN
AND EVER-MARRIED WOMEN, 1975

Age of Woman	All Women		Ever-Married Women		
	Bicol AFS ^{a/}	Philippines RPFS ^{b/}	Bicol A ^{c/}	B ^{d/}	Philippines RPFS ^{b/}
15-19	0.090	0.047	(0.188) ^{e/}	(0.244) ^{e/}	0.427
20-24	0.245	0.209	0.300	0.376	0.432
25-29	0.313	0.249	0.314	0.386	0.326
30-34	0.308	0.240	0.274	0.340	0.270
35-39	0.203	0.179	0.221	0.268	0.194
40-44	0.110	0.089	0.140	0.155	0.094
45-49	0.024	0.026	-	-	0.031
Total (15-44)	6.345	5.065	7.185	8.845	8.715
Total (15-49)	6.465	5.195	-	-	8.870

^{a/} From the 1979 AFS round. Three year moving average of 1974, 1975 and 1976 rates based on annual rates computed from the pregnancy history. See Concepcion, M.B. and J.V. Cabigon (1982, Table 3.9).

^{b/} From 1978 RPFS. See Concepcion, M.B. and J.V. Cabigon (1982, Tables 3.4 and 3.5).

^{c/} Estimated from the 1978 BMS; data from the abridged pregnancy history for the 1973-1977 period.

^{d/} Estimated from the 1978 BMS; data on children born during 1973-1977 as recorded in the household list.

^{e/} Less than 20 cases.

for comparison. This is because the abridged pregnancy history information was obtained only for the respondent (i.e., spouse of household head or female household head).

Next consider the age-specific marital fertility rates for Bicol as estimated from the abridged pregnancy history information, Estimate A, and for the Philippines, which represents the average rates of single year rates for the 1973-77 period. We should expect that the Bicol rates should conform to the age-pattern of marital fertility rates for the Philippines but that the level for each age-group would be higher. As the data show, however, the marital fertility rates estimated for Bicol appear to be too low for ages 15-19, 20-24 and 25-29 years compared to the Philippine average. It would thus appear that fertility of women as obtained from the abridged pregnancy history for the period 1973-77 are underreported, especially for younger women.

What might explain this underreporting of recent births of younger women in the abridged pregnancy history? As we have indicated in the previous section, the source of underreporting might be related to the reference period error, which would tend to be more serious among younger women since they would have more pregnancies (live births) to recall during the past five-year period. As a result, some pregnancies (live births) that did occur during the period may have been thought to have occurred outside the reference period, 1973-77, and therefore were not reported as occurring at any year within this reference period.

However, if reference period errors are to be expected from the abridged pregnancy history data, these errors should not seriously affect the number of children born during the period 1973-1977 as reported in the household list. We therefore obtained these data and compared them with data from the abridged pregnancy history. These data are shown as Estimate B in Tables 7 and 8. Note that the estimated births during the period based on data from the household list are higher than those obtained from the abridged pregnancy history. Likewise, for age-specific marital fertility rates, Estimate B is higher than Estimate A. It would thus appear that data from the abridged pregnancy history are unreliable both in terms of the age pattern and the level of fertility during 1973-1977. The data from the household list would, therefore, be more indicative of the true levels of recent fertility although the levels for the young age group 20-24 and 25-29 in Table 7 still appear too from what might be expected on the basis of the Philippine age pattern.

Awareness of Family Planning Methods and Source of Information. Table 9 presents the percentage distribution of women who reported having heard of specific methods of contraception and who reported ever use. The data from the 1978 BMS are compared with data for the Philippines derived from the 1978 RPFS. For the Philippines, two sets of percentages for ever heard are distinguished: column A percentages refer to women reporting ever heard of specific methods only after probing, while column B percentages refer to women spontaneously reporting awareness of specific methods. The

percentages for Bicol, on the other hand, refer only to spontaneous reports of specific methods except for rhythm, abstinence and withdrawal. For these three methods, interviewers were specifically instructed to probe respondents for possible awareness. The more useful information would have been the reports of ever heard after probing for each method, since this insures comparability of responses among women. Nonetheless the data in Table 9 indicate that the level of awareness of specific methods, especially of program methods among Bicol women, is lower than the average for the Philippines and suggest the need for additional efforts toward providing such information. Table 10 shows the percentage distribution of respondents who reported ever heard of specific methods by source of information. Note that the role of mass media in providing information appears to be surprisingly minimal. Family planning and other government workers appear to be the major sources of information, although private doctors and relatives and friends are also important sources.

Family Planning Practice. Data on ever use and current use of family planning methods shown in Tables 9 and 11, respectively, reveal low levels of contraceptive use in Bicol compared to the average for the Philippines. In the case of modern and more effective methods, i.e., pill, IUD, and sterilization, the current prevalence rate for Bicol women is only 7 percent as opposed to 17 percent for the Philippines in 1978. Overall contraceptive prevalence rate in 1978 is 32 percent for Bicol and 48 percent for the Philippines.

Table 9

PERCENTAGE DISTRIBUTION OF WOMEN WHO REPORTED HAVING
HEARD OF SPECIFIC METHODS OF CONTRACEPTION AND
WHO REPORTED EVER USE: PHILIPPINES
AND BICOL, 1978

	Percent Who Had Ever Heard of Method			Percent Ever Used	
	Philippines ^{a/}		Bicol ^{b/}	Philippines ^{a/}	Bicol ^{b/}
	A	B			
<u>Modern Program Methods</u>					
Pill	90.2	77.7	57.4	24.7	19.9
IUD	86.4	57.9	39.6	7.0	4.4
Female sterilization	74.7	25.4	11.9	4.5	1.5
Male sterilization	69.6	13.2	7.2	0.6	0.2
Other	39.9	8.7	-	2.9	-
<u>Other Program Methods</u>					
Rhythm	65.9	32.6	36.1	23.1	19.5
Condom	87.6	63.3	44.8	20.1	11.5
<u>Non-Program Methods</u>					
Abstinence	36.3	2.7	9.1	10.2	7.4
Withdrawal	65.3	19.5	10.7	31.0	6.4
Douche	21.2	1.0	-	2.2	-
Other	4.0	-	5.6	1.0	1.6

^{a/} Based on the 1978 RPFS; women are ever-married women age 15-45 years. NCSO, *et al.* (1979, p. 125). Column A refers to percentage of women who reported ever heard only after probing, while Column B refers to percentage of women who mentioned the method spontaneously.

^{b/} Based on the 1978 BMS; women are currently married women age 15-45 years. The number of ever-married and currently married in the BMS sample are 1,257 and 1,229, respectively. The percentage refers to women who mentioned specific methods spontaneously except for rhythm, abstinence and withdrawal where respondents were specifically asked regarding their awareness of such methods.

Table 10

PERCENTAGE DISTRIBUTION OF CURRENTLY MARRIED WOMEN RESPONDENTS
WHO REPORTED EVER HEARD OF SPECIFIC METHODS BY SOURCE OF
INFORMATION, BICOL RIVER BASIN, 1973

Source of Information	Modern Program Methods				Other Program Methods		Non-Program Methods		
	Pill	IU	Female Sterilization	Male Sterilization	Rhythm	Condom	Abstinence	With-drawal	Others ^{a/}
Family planning workers	47.5	46.8	51.4	51.7	46.3	48.9	16.1	44.7	34.8
Other government workers	7.2	7.8	6.2	10.1	5.6	6.9	3.6	4.5	11.6
Mass media	3.7	4.3	4.8	7.9	6.1	3.5	3.6	3.8	8.7
Private doctors	19.1	18.7	19.2	18.0	18.5	17.3	6.3	9.2	17.4
Relatives/neighbors/friends	21.8	22.0	16.4	12.4	18.0	22.5	36.6	28.0	20.3
Others	0.7	0.4	2.1	0.0	5.0	0.9	33.8	9.3	7.2
Total Percent	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Percent Reporting Ever-Heard	57.4	39.6	11.9	7.2	36.1 ^{b/}	44.8	9.1 ^{b/}	10.7 ^{b/}	5.6

n = 1,229

^{a/} Includes foam, diaphragm and folk methods.

^{b/} Percentage of respondents reporting ever heard only after probing.

Table 11

PERCENTAGE DISTRIBUTION OF CURRENTLY MARRIED WOMEN
 AGE 15-49 WHO ARE CURRENTLY USING SPECIFIC
 CONTRACEPTIVE METHODS: PHILIPPINES
 AND BICOL, 1978

Method	Philippines ^{a/} 1978 RPFS	Bicol ^{b/} 1978 BMS
<u>Modern Program Methods</u>	<u>16.6</u>	<u>7.3</u>
Pill	6.0	4.4
IUD	3.1	1.2
Female sterilization	6.2	1.5
Male sterilization	0.9	0.2
Other modern methods	0.4	-
<u>Other Program Methods</u>	<u>16.0</u>	<u>14.2</u>
Rhythm	11.3	11.2
Condom	4.7	3.0
<u>Non-Program Methods</u>	<u>15.1</u>	<u>10.3</u>
Abstinence	2.4	5.0
Withdrawal	12.5	4.6
Other	0.2	0.7
Total	47.7	31.8
Sample Size	6,684	1,229

^{a/} Based on the 1978 RPFS. Data refer to women who were married and living with their husbands at the time of the survey, who believed they were physically able to bear more children and who were not pregnant at the time of interview. NCSO, et al. (1979, p. 130).

^{b/} Based on the 1978 BMS. Data refer to women who were married and living with their husbands.

Data on contraceptive prevalence rates obtained by the Area Fertility Surveys shown in Table 12 reveal that Bicol had the lowest rate for all methods among the six surveyed regions in the Philippines. The prevalence rate for modern methods is only about half or less than those of the other regions.

Differentials in contraceptive use by selected characteristics of the woman are shown in Table 13. As might be expected, greater contraceptive use is found among women in urban than in rural areas and among women of higher education and higher economic status. It is interesting to note that contraceptive prevalence rates are higher in Camarines Sur than in Albay and Sorsogon, and among non-working women than working women. Non-working women, however, tend to use mainly the less effective methods.

The levels of and differentials in contraceptive use in Bicol are bound to be related to both the demand for children and to the effective cost of contraception. In the subsequent sections, we examine the correlates of both fertility and family planning behavior on the basis of the analytical framework described in the next section.

ANALYTICAL FRAMEWORK

General Framework. A general framework for understanding the dynamics of change arising from rural development activities is outlined below. The major components of this framework include

Table 12

CONTRACEPTIVE PREVALENCE RATES BY TYPE OF METHOD,
SELECTED REGIONS: AREA FERTILITY SURVEYS
1978, 1979, 1980

Method/Year	R E G I O N					
	Central Luzon	Western Visayas	Northern Mindanao	Metro Manila	Southern Tagalog	Bicol
<u>Modern Program Methods</u>						
1978	13.5	6.7	12.1	21.0	a/	a/
1979	17.8	9.0	12.6	25.1	18.2	5.6
1980	20.3	12.0	12.5	26.6	18.8	6.2
<u>Other Program Methods</u>						
1978	7.6	18.6	13.1	15.9	a/	a/
1979	10.5	18.5	15.4	16.2	9.8	12.8
1980	6.7	17.2	14.1	14.7	9.2	11.0
<u>Non-Program Methods</u>						
1978	9.6	7.5	3.8	6.6	a/	a/
1979	10.9	7.5	3.0	10.0	6.8	7.1
1980	7.6	7.4	4.6	8.9	5.6	8.7
<u>All Methods</u>						
1978	30.7	32.8	29.0	43.5	a/	a/
1979	39.2	35.0	31.0	51.3	34.8	25.5
1980	34.6	36.6	31.2	50.2	33.6	25.9

a/ Not included in the 1978 survey round.

SOURCE: Concepcion, M.B. and J.V. Cabigon (1982; Tables 4.6 and 4.7).

* Rates refer to current contraceptive use of currently married women age 15-44 years.

Table 13

PERCENTAGE OF CURRENTLY MARRIED WOMEN AGE 15-49
CURRENTLY USING CONTRACEPTIVE METHODS,
BY SELECTED CHARACTERISTICS OF THE
WOMAN, AND BY TYPE OF METHOD,
BICOL RIVER BASIN, 1978

Category of Woman	Modern Program Methods	Other Program Methods	Non-Program Methods	All Methods
<u>All Women</u>	7.3	14.2	10.3	31.8
<u>Province</u>				
Camarines Sur	6.0	15.2	13.6	34.7
Albay/Sorsogon	9.5	13.0	5.4	28.0
<u>Location</u>				
Poblacion/Urban	10.5	17.6	13.0	37.8
Rural	6.1	9.7	10.6	29.7
<u>Education of Woman</u>				
0-7 Years	6.2	9.8	10.6	26.6
8+ Years	9.8	22.2	7.7	39.7
<u>Work Status</u>				
Working	10.5	5.3	3.1	18.9
Not Working	2.7	28.0	21.2	51.9
<u>Housing Index</u>				
Light	2.7	4.0	3.5	10.2
Medium/Heavy	12.9	24.6	13.4	50.9

(a) a theory of household or other micro unit behavior; (b) the physical, social and economic environment; (c) autonomous changes in this environment; and (d) exogenous shocks to this environment arising from rural development activities.

In a general sense, the household or other micro unit, in an attempt to enhance its welfare, is viewed as actively responding to a set of opportunities and constraints in the context of social and cultural decision processes. The physical environment includes the natural resource endowments of the community including risks to production due to natural calamities such as typhoons. The economic and social environment, on the other hand, includes among others (a) the structure of markets and prices for factors and products, and (b) the social structure and social organization which defines, for example, land tenure status, crop sharing arrangements, patterns of family and non-family labor utilization and compensation, and social, economic and political alliances which influence cooperative behavior and community participation. Autonomous changes in the environment include, for example, changes in international prices for agricultural export crops, national trends in prices, technology changes, etc. Another source of shocks to the environment is the set of rural development interventions. These interventions include (a) the provision of physical infrastructures such as roads, irrigation, flood control, electrification, etc.; (b) the provision of social infrastructures and services in the area of health, education, nutrition, environmental sanitation, and family planning; (c) agricultural programs,

such as land reform, development of cooperatives, provision of extension services and rural credit, and of various input subsidies and price supports; and (d) industrial development interventions such as tax and other incentives, credit and various subsidies to small and large-scale enterprises.

In this framework, either sources of change (autonomous shocks or government interventions) affect the structure of opportunities and constraints facing households. These households are then expected to respond to these changes in a manner they perceive will improve their present economic and social position. Depending upon the nature of the emerging structure of opportunities and constraints, we may expect a "multiphasic response" from these households in terms of social, economic and demographic adjustments.

Determinants of Fertility and Family Planning Behavior. On the basis of a synthesis of the demographic, sociological, psycho-social and economic studies on fertility, one can view the determinants of fertility and family planning behavior, within the above general framework, as working through one or more of the following components.*

- a) the demand for children, N , i.e., the number of surviving children parents would want if fertility regulation were costless;

*/ See for example the synthesis provided by Easterlin, et al. (1981).

- b) the potential output of surviving children, S , i.e., the number of surviving children parents would have if they did not deliberately limit fertility; and
- c) the effective cost of fertility regulation, C .

Given a set of preferences, the demand for children, N , is a function of income and the price of children relative to other goods. All things being equal, an increase in income increases the demand for children because parents can afford more goods including children. However, an increase in income also changes the price of children relative to other goods through various ways depending upon the nature of the income change. For example, if child bearing and rearing is intensive of the mother's time, an increase in income due to an increase in the mother's wage rate increases the opportunity cost of children, i.e., the income foregone by the mother by spending more time in child bearing and rearing than in the labor market. Furthermore, children are valued not only as a "consumption" good but also as productive agents and as a source of old age security. Children are also valued as a general source of risk insurance, i.e., insurance against events that threaten normal consumption streams.^{*/} The sources of risk may include weather-induced risk which affects agricultural production and the risk to women of substantial loss in economic welfare if widowed or if their husbands become seriously ill or disabled. Off-farm incomes of children may help maintain

^{*/}See Cain (1981).

consumption standards in the face of poor harvests. Likewise, economic welfare of widowed women might be maintained with the support of surviving children. An increase in income widens the range of investment alternatives for parents, since with higher income parents can have more effective access to capital markets. This reduces the effective cost of these alternatives. If these investment alternatives are substitutes for the economic support to be derived from children, then we expect a substitution away from children.

The number of potential surviving children, (S) , depends on natural fertility and the probability of infants surviving to adulthood. Natural fertility, that is fertility in the absence of voluntary control, is expected to be related to factors affecting fecundity, fetal mortality, etc. such as the age and health of the mother. Infant mortality, likewise, is expected to be related to factors affecting the health and nutrition of children such as breastfeeding, consumption of goods and services and the education of the woman. The factors affecting natural fertility and infant survival are in turn affected by household income, such that as incomes rise, the potential number of births and the infant survival probabilities increase, leading to higher potential numbers of surviving children.

The motivation to practice fertility control arises when the potential number of surviving children exceeds the desired number. The efficiency by which parents can practice fertility control,

which eventually determines their actual completed family size, depends upon the attitudes of parents towards fertility control, the cost of information and supplies/services of specific contraceptive techniques and on income.

How do rural development efforts affect fertility and family planning decisions within the simple framework described above? Among other major mechanisms, rural development efforts are expected to increase production and employment opportunities in the rural areas, thereby increasing the wage rates of both husbands and wives. Changes in the wage rates, as we have earlier indicated, both have positive effects (pure income effect) and negative effects (price effect) on the demand for children, the latter would be expected to be larger in the low income setting of Bicol. Likewise, changes in wage rates would tend to increase the potential number of surviving children, as the resulting increase in incomes lead to better nutrition and health of mothers and their children. Development efforts, specifically in the area of health and nutrition, also directly affect the potential number of surviving children.

Where the net effects of all the above changes lead to a greater potential relative to desired number of children, the motivation to practice family control increases. The higher income of households increases their ability to obtain contraceptive information and supplies/services. The family planning program in turn is expected to generate more favorable attitudes towards contraception, e.g., by eliminating legal barriers to the practice

of contraception. Moreover, by increasing the flow of information and access to contraceptive supplies and services, the program reduces the effective cost of contraception, thereby increasing the ability of parents to equate their desired and potential number of children.

Empirical Models. The demographic behavior that we observe are the number of births, the number of children who have died, and the use of contraception. This section outlines the empirical models for analyzing the correlates of these objective indicators.

Three sets of models will be examined. The first of these views children ever born, child deaths and ever use of contraception as jointly determined by common set of factors. The model can be written as follows:

- (1) CEB: AGEW, AGEM, EDW, \hat{WAGEH} , \hat{WAGEW} , HHASSETS, LOC, RDA
- (2) CDEATH: AGEW, AGEM, EDW, \hat{WAGEH} , \hat{WAGEW} , HHASSETS, LOC, RDA
- (3) EVERUSE: AGEW, AGEH, EDW, \hat{WAGEH} , \hat{WAGEW} , HHASSETS, LOC, RDA
- (4) WAGEH: AGEH, EDH, LOC, RDA
- (5) WAGEW: AGEW, EDW, LOC, RDA

The definition and measurement of variables as well as the hypotheses are summarized in Table 14.

The second model views the number of births during the past five years (or past two years) and use of contraception during the respective reference periods as jointly determined by common factors, including the number of children already born at the beginning of the reference period. This model can be written as follows:

(6) BIRTHS: AGEW, AGEM, EDW, PPARITY, $W\hat{A}G\hat{E}H$, $W\hat{A}G\hat{E}W$, HHASSETS, LOC, RDA

(7) FPUSE: AGEW, AGEM, EDW, PPARITY, $W\hat{A}G\hat{E}H$, $W\hat{A}G\hat{E}W$, HHASSETS, LOC, RDA

Finally, we consider a third model which looks at current fertility preference, measured by whether or not the woman wants additional children, and actual use of family planning methods. Thus we have

(8) ADDCHILD: AGEW, AGEM, EDW, LIVINGCHILD, $W\hat{A}G\hat{E}H$, $W\hat{A}G\hat{E}W$, HHASSETS,
LOC, RDA

(9) CFPUSE: AGEW, AGEM, EDW, LIVINGCHILD, $W\hat{A}G\hat{E}H$, $W\hat{A}G\hat{E}W$, HHASSETS
LOC, RDA

Both $W\hat{A}G\hat{E}H$ and $W\hat{A}G\hat{E}W$ are estimated from (4) and (5).

Table 14

LIST OF VARIABLES AND MAJOR HYPOTHESES

Symbols	Definition/Measurement and Hypotheses
<u>Dependent</u>	
1. ADDCHILD	Dummy variable (=1 if the woman reported that she wanted additional children at the time of interview; 0 = otherwise).
2. BIRTH 73 (76)	Number of children born during the period 1973-1977 (1976-1977).
3. CEB	Number of children ever born.
4. CDEATH	Reciprocal of the proportion of children surviving of children ever born.
5. CFPUSEA	Dummy variable (=1 if the woman is using any method of contraception at the time of interview; 0 = otherwise).
6. CFPUSEM	Dummy variable (=1 if the woman is using any modern method of contraception at the time of interview, i.e., pill, IUD, sterilization or injection; 0 = otherwise).
7. EVERUSEA	Dummy variable (=1 if the woman has ever used any family planning methods; 0 = otherwise).
8. EVERUSEM	Dummy variable (=1 if the woman has ever used any modern method of contraception, i.e., pill, IUD, sterilization or injection; 0 = otherwise).
9. FPUSEA 73 (76)	Dummy variable (=1 if the woman used any family planning methods during the period 1972-1977 (1976-77); 0 = otherwise).
10. FPUSEM 73 (76)	Dummy variable (=1 if the woman used any modern method of contraception during the period 1972-1977 (1976-77); 0 = otherwise).
11. WAGEH	Natural logarithm of the hourly wage rate of the husband.

Table 14 (cont.)

Symbols	Definition/Measurement and Hypotheses
12. WAGEW	Natural logarithm of the hourly wage rate of the wife.
<u>Independent</u>	
Personal Characteristics	
13. AGEW	Age of wife in completed years.
14. AGEWK	Dummy variable (=1 if the woman age belong to category K; 0 = otherwise, where K is coded as
	<ul style="list-style-type: none"> 1 = age 15-24 years 2 = age 25-29 years 3 = age 30-34 years 4 = age 35-39 years 5 = age 40-44 years 6 = age 45-49 years
	<p>The number of children ever born is expected to increase with age, but the rate of increase declines at older ages due to declining fecundity, hence AGEW will have a non-linear relationship with CEB. Perception of declining fecundity among older women may reduce the need for contraception, hence family planning use will be less among older women. AGEW will be positively related to the mean age of children and, therefore, negatively related to child survival rates.</p>
15. AGEM	<p>Age at marriage in completed years. Higher age at marriage reduces the reproductive life span and is, therefore, expected to be negatively related to CEB, but may be positively related to BIRTHS or ADDCHILD, and therefore negatively to family planning use, if women try to catch up with delayed fertility.</p>
16. EDW	<p>Educational attainment of the wife, measured as the highest grade of schooling completed in years.</p>

Table 14 (cont.)

Symbols	Definition/Masurement and Hypotheses
17. EDWK	<p>Dummy variable (=1 if the woman's level of educational attainment belong to category K; 0 = otherwise, where K is coded as</p> <p>1 = no schooling or finished up to four years of schooling 2 = finished 5 to 7 years of schooling 3 = finished 8 years of schooling or more</p> <p>(EDW) = [EDW (5-7), EDW (8+)]</p> <p>In the absence of wage information, EDW proxies for the wife's wage rate. The higher the education of the woman, the higher the potential wage rate and, therefore, the value of her time or opportunity cost of children. Increased education also means greater knowledge of family planning methods, hence, it will be expected to be positively related to family planning use. Increased education increases the health and nutrition knowledge of the woman and is, therefore, expected to be negatively related to child deaths.</p>
18. LIVING CHILD	Number of surviving children at time of interview.
19. LIVING CHILD K	<p>Dummy variable (=1 if belong to category K and 0 = otherwise, where K is coded as</p> <p>1 = 0-2 living children 2 = 3-4 living children 3 = 5-6 living children 4 = 7 or more living children</p> <p>(LIVING CHILD) = [LIVING CHILD (3-4), LIVING CHILD (5-6), LIVING CHILD (7+)]</p> <p>The larger the number of living children the woman already has, the less likely she will want additional children and more likely she will practice family planning.</p>
20. PPARITY 5(2)	Number of children ever born prior to 1973 (1976).

Table 14 (cont.)

Symbols	Definition/Measurement and Hypotheses
21. PPARITY 5(2) K	Dummy variable (=1 if in category K, 0 = otherwise; where K is coded as
	1 = 0-2 children born prior to 1973 (1976) 2 = 3-4 children born prior to 1973 (1976) 3 = 5-6 children born prior to 1973 (1976) 4 = 7 or more children born prior to 1973 (1976)
	$(PPARITY) = [PPARITY (3-4), PPARITY (5-6), PPARITY (7+)]$
	The higher the PPARITY, the closer is the women to her desired fertility and hence the less likely she will have more additions to current stock, and more likely to practice contraception.
22. PLIVINGCHILD 73(76)	Number of surviving children prior to 1973 (1976).
23. PLIVINGCHILD 73(76)	Dummy variable (=1 if in category K, 0 = otherwise; where K is coded as
	1 = 0-2 living children prior to 1973 (1976) 2 = 3-4 living children prior to 1973 (1976) 3 = 5-6 living children prior to 1973 (1976) 4 = 7+ living children prior to 1973 (1976)
	$(PLIVINGCHILD) = [PLIVINGCHILD (3-4), PLIVINGCHILD (5-6), PLIVINGCHILD (7+)]$
	The higher the PLIVINGCHILD previous to the reference period, the less the additional number of births and the greater the use of contraception during the reference period.

Table 14 (cont.)

Symbols	Definition/Measurement and Hypotheses
Household Characteristics	
24. $W\hat{A}G\hat{E}H$ ($W\hat{A}G\hat{E}W$)	<p>Natural logarithm of the hourly wage rate of the husband (wife) predicted from husband's (wife's) background characteristics, locational characteristics and rural development indicators. An increase in $W\hat{A}G\hat{E}H$ and $W\hat{A}G\hat{E}W$ are expected on balance to reduce the dependence on children as productive agents, old age security and risk insurance, while an increase in $W\hat{A}G\hat{E}W$ is expected on balance to increase the value of time of the mother. Both variables are expected to be negatively related to fertility and positively to family planning practice.</p> <p>Moreover, an increase in both will tend to reduce $CDEATH$ due to greater health and nutrition consumption possibilities, hence both wage variables will be negatively related to $CDEATH$.</p>
25. $HOUSE$	<p>Dummy variable (=1 if the house is made of light construction materials; 0 = otherwise). In the absence of wage information, this variable proxies for the husband's wage rates, which determines the largest component of household income. At low incomes, the value of children as productive agents, old age security and risk insurance will tend to be higher, leading to a greater demand for children. $HOUSE$ is expected to be positively related to fertility and negatively to family planning use. Additionally, $HOUSE$ is expected to be positively related to $CDEATH$ due to the effect of income constraints on health and nutrition of children.</p>
26. $OWNHOUSE$	<p>Dummy variable (=1 if the household own the house; 0 = otherwise).</p>

Table 14 (cont.)

Symbols	Definition/Measurement and Hypotheses
27. OWNLAND	<p>Dummy variable (=1 if the household own agricultural land; 0 = otherwise). Both OWNHOUSE and OWNLAND proxy for household productive assets which determine the household's non-labor income. Both are expected to be positively related to fertility, and negatively to family planning and child deaths.</p>
<u>Locational Characteristics</u>	
28. LOC	<p>Location variable (=1 if the barangay is located in K and 0 = otherwise, where K is coded as</p>
	<p>CITY = urban (city) POBLACION = municipal poblacion RURAL = rural barangay</p>
	<p>(LOC) = (MUN POBLACION, RURAL)</p>
	<p>Location reflects access to economic and social services related to health, family planning and high wage employment, hence, wage rates will tend to be higher in cities than in either poblacion or rural barangays. Fertility and child deaths are expected to be lower in cities than in poblacions or rural barangays, but conversely for family planning use.</p>
29. PROV	<p>Province (=1 if in province K, and 0 = otherwise, where K is coded as</p>
	<p>1 = Sorsogon 2 = Albay 3 = Camarines Sur</p>
	<p>(PROV) = (ALBAY, CAM SUR)</p>
30. RESBGY	<p>Length of residence in barangay (=1 if household head has resided in barangay for 5 years or more; 0 = otherwise). This is a control variable for length of exposure to the community environment and to the rural development activities in the community.</p>

Table 14 (cont.)

Symbols	Definition/Measurement and Hypotheses
<u>Rural Development Activities</u>	
31. RDA	Rural development activities are proxied by AELEC, IRRIG and TRAVELPOB.
32. AELEC	Dummy variable (=1 if the barangay is electrified; 0 = otherwise).
33. IRRIG	Dummy variable (=1 if the barangay has irrigation facilities; 0 = otherwise).
34. TRAVELPOB	Travel time in minutes from the rural barangay to the municipal poblacion.
	Rural electrification, the provision of irrigation facilities and the development of road networks are expected to increase employment opportunities, and hence wage rates, which in turn are expected to affect fertility, child mortality, and family planning behavior in the direction described earlier.
	Additionally, the development of road networks directly facilitates the household's access to health, family planning services and hence, we expect TRAVELPOB to be positively related to fertility and child deaths and to be negatively related to family planning use.

REGRESSION RESULTS

Male and Female Wage Rates. As described earlier, rural development efforts are expected to affect fertility and family planning behavior either directly through increasing access to basic services such as health and family planning services, or indirectly through their impact on production and employment, and therefore on the wage rates of both husbands and wives. We assume that the main impact of the rural electrification, irrigation and road network development programs in Bicol is through their effect on wage rates. In addition, the development of road network is expected to facilitate household's access to health and family planning services found in the municipal poblacions or cities.

Table 15 shows the effect of electrification, irrigation and road network development on the wage rates of female respondents and of males 25 years and older.*/ The road network development is proxied by travel time to the poblacion. Note that the development variables are indeed significant in explaining wage differentials. Specifically, female wage rates tend to rise in irrigated areas, presumably through increased demand for adult labor generated by this more labor intensive agricultural technology. Similarly, male wage rates tend to rise in irrigated areas, in areas with better road network and to some extent in electrified areas, after controlling for personal characteristics and location of residence. It appears therefore that rural development efforts in Bicol have had a significant impact on the

*/The dependent variables are the natural logarithm of the hourly wage rates of females respondents and of males 25 years old and over, respectively.

Table 15
REGRESSION ON MALE AND FEMALE WAGE RATES
BICOL RIVER BASIN, 1978

Female Respondents

<u>Variable</u>	<u>Mean (Std. Dev.)</u>	<u>Coefficient (t-value)</u>
AGE	41.479 (12.058)	0.007 (1.559)
ED	5.650 (4.473)	0.110 (8.657)***
CITY	0.202 (0.402)	0.414 (2.884)***
IRRIG.	0.240 (0.428)	0.412 (3.096)***
Constant		-1.329
\bar{R}^2		0.145
F		24.219
Mean		-0.228
Std. Dev.		1.377
n		549

Males 25 Years and Over

<u>Variable</u>	<u>Mean (Std. Dev.)</u>	<u>Coefficient (t-value)</u>
AGE	40.598 (11.443)	0.050 (2.322)**
AGESQ	-	-0.0005 (-2.065)**
ED	5.395 (4.271)	0.054 (6.587)***
CITY	0.226 (0.418)	0.362 (4.121)***
POBLACION	0.114 (0.318)	0.219 (1.919)*
AELEC	0.561 (0.497)	0.115 (1.532)
IRRIG	0.231 (0.422)	0.171 (1.999)**
TRAVELPOB	38.427 (86.585)	-0.001 (-2.197)**
Constant		-1.199
\bar{R}^2		0.138
F		12.443
n		572
Mean		0.397
Std. Dev.		0.874

SOURCE: Paqueo, V.B., et al. (1983; separate report on BMS).

* / ** / *** / Significant at the 0.10, 0.05 and 0.01 levels, respectively.

income generating potentials of individuals and households. Exogenous changes in wage rates in turn influence fertility, family planning and other aspects of household decisions as revealed by the regression results below.

Children Ever Born and Ever Use of Family Planning Methods.

Table 16 presents the regression results on children ever born (CEB), child deaths (CDEATH), and ever use of family planning methods (EVERUSEA and EVERUSEM). In this single period framework, the dependent variables are jointly determined by a common set of exogenous factors. This statistical approach was adopted to eliminate simultaneity bias with respect to the relationships between CEB and CDEATH and between CEB and EVERUSEA or EVERUSEM. The sample includes married women age 15-49 years, currently living with their husbands who in turn are the household heads. The wage rates of the wife and of the husband are predicted on the basis of the relationships shown in Table 15. The results in Table 16 may be summarized as follows:

- (1) We expected both wage rate variables to be negatively related to children ever born, CEB, and child deaths, CDEATH, and to be negatively related to the two alternative measures of ever use of family planning methods, EVERUSEA and EVERUSEM. The results reveal that only the wage rate of the wife, WAGEW, is significantly related to CEB, while only the wage rate of the husband, WAGEH, is significantly related to CDEATH and EVERUSEA or EVERUSEM.

Table 16

REGRESSION ON CHILDREN EVER BORN, CHILD DEATHS AND EVER USE OF
FAMILY PLANNING METHODS, BICOL RIVER BASIN, 1978

Variables	Mean ^{a/}	CEB ^{b/}	CDEATH ^{b/}	EVERUSEA ^{b/}	EVERUSEM ^{b/}
AGEW (25-29)	0.165 (0.371)	1.351*** (5.279)	-0.033 (-1.074)	0.160*** (2.864)	0.135*** (2.777)
AGEW (30-34)	0.215 (0.411)	2.721*** (10.537)	0.004 (0.136)	0.148*** (2.639)	0.185*** (3.781)
AGEW (35-39)	0.183 (0.387)	4.281*** (15.720)	0.033 (1.004)	0.093 (1.567)	0.130** (2.528)
AGEW (40-44)	0.172 (0.377)	5.711*** (20.681)	0.055* (1.653)	0.076 (1.257)	0.065 (1.242)
AGEW (45-49)	0.167 (0.373)	5.919*** (20.761)	0.021 (0.603)	-0.148** (-2.380)	-0.079 (-1.465)
EDW (5-7)	0.498 (0.500)	-0.099 (-0.564)	-0.026 (-1.205)	0.093** (2.443)	0.036 (1.072)
EDW (8+)	0.247 (0.432)	-0.652** (-2.344)	-0.007 (-0.212)	0.229*** (3.776)	0.094* (1.777)
AGEM	20.698 (6.691)	-0.091*** (-9.544)	-0.002* (-1.665)	-0.005** (-2.202)	-0.002 (-0.902)
OWNHOUSE	0.908 (0.289)	0.420* (1.876)	-0.006 (-0.229)	-0.045 (-0.930)	-0.053 (-1.249)
OWNLAND	0.129 (0.335)	0.245 (1.265)	-0.013 (-0.540)	-0.052 (-1.241)	-0.021 (-0.582)
RESBGY (5+)	0.773 (0.419)	0.741*** (4.438)	0.020 (0.975)	0.032 (0.880)	0.074** (2.352)
MUN POBLACION	0.146 (0.354)	-0.600** (-2.287)	0.032 (1.021)	0.061 (1.070)	0.095* (1.910)
RURAL	0.712 (0.453)	-0.085 (-0.339)	0.018 (0.586)	0.206*** (3.784)	0.121** (2.559)
RURAL x TRAVELPOB	45.785 (69.181)	0.0001 (0.100)	-0.0002* (-1.699)	-0.0002 (-0.950)	-0.0004* (-1.722)
CAM SUR	0.602 (0.490)	-0.050 (-0.262)	0.031 (1.349)	-0.026 (-0.641)	-0.036 (-0.999)
ALBAY	0.257 (0.437)	-0.335 (-1.567)	0.002 (0.084)	-0.162*** (-3.469)	-0.053 (-1.299)
WAGEW	-0.099 (0.445)	-0.723** (-2.521)	-0.011 (-0.322)	-0.013 (-0.211)	0.014 (0.251)
WAGEH	0.456 (0.328)	0.212 (0.536)	-0.093* (-1.943)	0.370*** (4.294)	0.125* (1.669)
Constant		3.312	1.180	0.179	0.026
R ²		0.538	0.017	0.141	0.078
F		77.891	2.144	11.842	6.549
n		1,188	1,188	1,188	1,188
Mean		5.675	1.133	0.486	0.228
Std. Dev.		3.131	0.259	0.500	0.420

a/ Standard deviation in parenthesis.

b/ t-value in parenthesis.

*/ **/ ***/ Significant at the 0.10, 0.05 and 0.01 levels, respectively.

(2) We expected the effect of non-labor incomes proxied by OWNHOUSE and OWNLAND to be positively related to CEB and negatively related to CDEATH and EVERUSEA or EVERUSEM. The results reveal only OWNHOUSE is significantly with respect to CEB.

(3) CEB increases with age of woman, AGEW, but increases more slowly at older ages reflecting declining fecundity. It would also reflect underenumeration of children ever born by older women. AGEW was expected to be positively related to CDEATH since AGEW reflect the exposure of children to the risks of mortality, that is, children of older women are expected to be older on the average than the children of younger women. AGEW however is not significantly related to CDEATH except in one age group, and suggest the presence of reporting error on the part of older women who might have tended to report only surviving children.

The ever use of family planning methods declines significantly at older ages as expected.

(4) Age at marriage, AGEM, is significantly related with lower children ever born as expected. It is likewise negatively related to CDEATH and EVERUSEA.

(5) The educational attainment of the wife, EDW, is negatively related to CEB and positively related to everuse of family planning as expected. Since the value of time aspect of education is already captured in the WAGEW variable, the education of the wife is here interpreted as reflecting aspirations for different lifestyles that

compete with large number of children in the case of its relation with CEB, and greater knowledge and more favorable attitudes toward family planning methods in case of its relation with EVERUSEA and EVERUSEM. We also expected EDW to be negatively related with CDEATH, however, the relationship is not significant.

(6) Households who have resided on the barangay for five years or more, RESBGY (5+), tend to have larger CEB and practice more modern contraception than recent residents. The greater practice of contraception among the longer time residents can be interpreted as a response to their higher fertility compared to recent residents.

(7) Controlling for personal and household characteristics, we expect area of residence to reflect differentials in access to health and family planning services and such differentials in turn will affect fertility, child mortality and family planning use. We expect a gradient of low to high fertility as one moves from city to poblacion to rural barangays, and conversely for child mortality and family planning use. The results of our regressions, however, do not exhibit consistent patterns of areal differentials, except that CDEATH increases the farther the rural barangay is to the municipal poblacion as expected. The use of family planning methods tends to be higher in rural areas than in the city or poblacion contrary to expectations. One possible explanation for this contrary finding might be related to reporting errors on the part of rural respondents who might feel more intimidated regarding questions on family planning and therefore would tend to give false reports of ever use. On the other hand, rural

Women may indeed use more family planning methods than their poblacion or city counterparts if family planning workers personally visit rural women more than they do poblacion or city women to encourage use of contraception. Note that the data on Table 13 showing higher contraceptive use among poblacion/urban women than rural women do not control for other factors, and hence the findings in Table 13 are not necessarily inconsistent with our regression results. Finally, note that contraceptive use in Albay is much lower than in Camarines Sur and Sorsogon.

Table 17 provides an alternative specification whereby the wage variables are substituted by the developmental variables, AELEC and IRRIG. Additionally, HOUSE can be looked upon as an indicator of household income. Note that HOUSE is consistently significant and in the expected direction in its relation with CEB, CDEATH, EVERUSEA and EVERUSEM, that is, poorer households tend to have more children, experience higher child mortality, and use less contraception than better-off households. Poverty is clearly related to the demographic behavior of households.

Fertility and Family Planning Practice in the Past Five Years.

The effects of rural development activities in Bicol could be more properly assessed in terms of their effects on current or more recent demographic behavior. The time dimension is obviously important.

One cannot properly infer that rural development activities influence behavior that have occurred in the past prior to the period where the cumulative impacts of such rural development activities can be felt

Table 17

REGRESSION ON CHILDREN EVER BORN, CHILD DEATHS AND EVER USE OF
FAMILY PLANNING METHODS, BICOL RIVER BASIN, 1978

Variables	Mean ^{a/}	CEB ^{b/}	CDEATH ^{b/}	EVERUSEA ^{b/}	EVERUSEM ^{b/}
AGEW (25-29)	0.165 (0.371)	1.363*** (5.334)	-0.033 (-1.062)	0.169*** (3.035)	0.136*** (2.802)
AGEW (30-34)	0.215 (0.411)	2.744*** (10.797)	-0.001 (-0.044)	0.181*** (3.262)	0.192*** (4.001)
AGEW (35-39)	0.183 (0.387)	4.304*** (16.131)	0.028 (0.871)	0.128** (2.208)	0.139*** (2.746)
AGEW (40-44)	0.172 (0.377)	5.733*** (21.220)	0.049 (1.503)	0.114* (1.937)	0.074 (1.452)
AGEW (45-49)	0.167 (0.373)	5.925*** (21.200)	0.017 (0.492)	-0.112* (-1.842)	-0.071 (-1.340)
EDW (5-7)	0.498 (0.500)	-0.275* (-1.748)	-0.029 (-1.546)	0.105*** (3.066)	0.043 (1.439)
EDW (8+)	0.247 (0.432)	-1.115*** (-5.745)	-0.020 (-0.849)	0.264*** (6.222)	0.113*** (3.074)
AGEM	20.698 (6.691)	-0.092*** (-9.697)	-0.002* (-1.641)	-0.005** (-2.236)	-0.002 (-0.929)
HOUSE (Light)	0.608 (0.488)	0.260* (1.843)	0.051*** (3.032)	-0.121*** (-3.919)	-0.055** (-2.074)
OWNHOUSE	0.908 (0.289)	0.375* (1.660)	-0.010 (-0.381)	-0.039 (-0.792)	-0.045 (-1.061)
OWNLAND	0.128 (0.335)	0.258 (1.328)	-0.011 (-0.488)	-0.069* (-1.638)	-0.026 (-0.720)
RESBGY (5+)	0.773 (0.419)	0.734*** (4.400)	0.021 (1.028)	0.037 (1.016)	0.077** (2.429)
MUN POBLACION	0.146 (0.354)	-0.327 (-1.351)	0.051* (1.763)	0.015 (0.280)	0.069 (1.498)
RURAL	0.712 (0.453)	0.167 (0.833)	0.057** (2.386)	0.066 (1.513)	0.069* (1.823)
RURAL x TRAVELPOB	45.785 (69.181)	-0.0002 (-0.204)	-0.0002 (-1.295)	-0.001** (-2.307)	-0.0004** (-2.204)
AELEC	0.376 (0.485)	0.048 (0.318)	-0.018 (-0.983)	0.044 (1.346)	0.029 (1.034)
IRRIG	0.546 (0.498)	-0.201 (-1.547)	-0.029* (-1.869)	0.018 (0.649)	0.005 (0.206)
CAM SUR	0.602 (0.490)	-0.100 (-0.520)	0.025 (1.086)	-0.004 (-0.087)	-0.027 (-0.728)
ALBAY	0.257 (0.437)	-0.418* (-1.923)	-0.012 (-0.476)	-0.128*** (-2.700)	-0.038 (-0.932)
Constant		3.526	1.114	0.446	0.115
R ²		0.537	0.022	0.136	0.078
F		73.598	2.433	10.875	6.275
n		1,189	1,189	1,189	1,189
Mean		5.675	1.133	0.486	0.229
Std. Dev.		3.131	0.259	0.500	0.420

a/ Standard deviation in parenthesis.

b/ t-value in parenthesis.

*/ **/ ***/ Significant at the 0.10, 0.05 and 0.01 levels, respectively.

and observed. Our previous discussion on the determinants of children ever born should therefore be interpreted in this light. Childbearing decisions among older women in the early part of their reproductive life cycle may not be related to changes brought about by recent rural development activities.

The correlates of recent demographic behavior can be examined from Tables 18 and 19 for the period 1973-1977, and from Tables 22 and 23 for the period 1976-1977. We first present the results of the regression on births and family planning practice during the period 1973-1977. The sample of currently married women age 15-49 years with husband present was further restricted to include only women who were married prior to 1973. Births during the period 1973-1977 are based on data from the household list and not from the abridged pregnancy history, since the former appear to be more reasonable than the latter in terms of reliability and accuracy, as described earlier. Correspondingly, the use of family planning methods refers to reported ever use from the period 1972-1973 through 1976-1977 for which data was collected and coded. Since the reported fertility of the youngest age group of women appear to be too low relative to what might be expected, we excluded this group from the sample. The results in Table 18 are highlighted below.

(1) The exogenous increase in the husband's wage rate, WAGEH, partly due to the effects of rural development activities in the area, significantly reduces births during the recent five-year period, BIRTHS73, and increases the use of contraceptive methods, FPOSEA73,

Table 18

REGRESSION ON FERTILITY AND FAMILY PLANNING PRACTICE
DURING THE 1973-1977 PERIOD, BICOL RIVER BASIN, 1978

Variables	Mean ^{a/}	BIRTH73 ^{b/}	FPUSEA73 ^{b/}	FPUSEM73 ^{b/}
AGEW73 (25-29)	0.241 (0.428)	-0.312*** (-2.856)	-0.079 (-1.413)	0.065 (1.377)
AGEW73 (30-34)	0.215 (0.411)	-0.685*** (-5.321)	-0.219*** (-3.304)	-0.052 (-0.932)
AGEW73 (35-39)	0.205 (0.404)	-1.239*** (-8.718)	-0.246*** (-3.374)	-0.131** (-2.129)
AGEW73 (40-44)	0.201 (0.401)	-2.021*** (-13.464)	-0.485*** (-6.291)	-0.254*** (-3.905)
EDW (5-7)	0.485 (0.500)	0.007 (0.083)	0.068* (1.675)	0.022 (0.639)
EDW (8+)	0.232 (0.423)	-0.290** (-2.253)	0.168** (2.547)	0.055 (0.984)
AGEM	20.238 (4.210)	0.041*** (4.850)	0.008* (1.825)	0.004 (1.133)
OWNHOUSE	0.920 (0.271)	0.253** (2.275)	0.010 (0.168)	-0.044 (-0.914)
OWNLAND	0.126 (0.332)	-0.123 (-1.362)	-0.008 (-0.177)	0.018 (0.469)
MUN POBLACION	0.156 (0.363)	-0.284** (-2.365)	0.042 (0.677)	0.108** (2.078)
RURAL	0.705 (0.456)	-0.160 (-1.369)	0.207*** (3.451)	0.158*** (3.137)
RURAL x TRAVELPOB	45.221 (70.745)	-0.001 (-1.028)	-0.0002 (-0.719)	-0.001*** (-2.615)
RESBGY (5+)	0.862 (0.345)	-0.104 (-1.199)	0.003 (0.064)	0.047 (1.265)
CAM SUR	0.599 (0.490)	0.086 (0.985)	-0.005 (-0.110)	-0.041 (-0.081)
ALBAY	0.255 (0.436)	0.034 (0.343)	-0.148*** (-2.946)	-0.089** (-2.103)
PPARITY73 (3-4)	0.240 (0.427)	-0.110 (-1.173)	0.093* (1.920)	0.004 (0.106)
PPARITY73 (5-6)	0.202 (0.402)	0.204* (1.780)	0.135** (2.301)	0.044 (0.896)
PPARITY73 (7+)	0.315 (0.465)	0.437*** (3.391)	0.173*** (2.604)	0.110** (1.970)
WAGEW	-0.100 (0.453)	0.017 (0.132)	0.085 (1.248)	0.102* (1.790)
WAGEH	0.481 (0.326)	-0.535*** (-2.894)	0.315*** (3.317)	0.080 (0.162)
Constant		1.633	0.052	0.067
R ²		0.322	0.145	0.069
F		24.293	9.315	4.650
n		961	981	981
Mean		1.417	0.431	0.200
Std. Dev.		1.083	0.495	0.400

a/ Standard deviation in parenthesis.

b/ t-value in parenthesis.

*/ **/ ***/ Significant at the 0.10, 0.05 and 0.01 levels, respectively.

Table 19

REGRESSION ON FERTILITY AND FAMILY PLANNING PRACTICE
DURING THE 1973-1977 PERIOD, BICOL RIVER BASIN, 1978

Variables	Mean ^{a/}	BIRTH73 ^{b/}	FPUSEA73 ^{b/}	FPUSEM73 ^{b/}
AGEW73 (25-29)	0.241 (0.428)	-0.338*** (-3.116)	-0.061 (-1.085)	0.065 (1.375)
AGEW73 (30-34)	0.215 (0.411)	-0.709*** (-5.538)	-0.207*** (-3.141)	-0.054 (-0.978)
AGEW73 (35-39)	0.205 (0.404)	-1.262*** (-8.921)	-0.236*** (-3.239)	-0.133** (-2.173)
AGEW73 (40-44)	0.201 (0.401)	-2.035*** (-13.619)	-0.476*** (-6.190)	-0.254*** (-3.923)
EDW (5-7)	0.485 (0.500)	-0.004 (-0.061)	0.108*** (2.980)	0.048 (1.587)
EDW (8+)	0.232 (0.423)	-0.338*** (-3.730)	0.268*** (5.737)	0.120*** (3.059)
AGEM	20.238 (4.210)	0.040*** (4.728)	0.010** (2.314)	0.005 (1.385)
OWNHOUSE	0.920 (0.271)	0.255** (2.292)	0.007 (0.125)	-0.036 (-0.752)
OWNLAND	0.126 (0.332)	-0.121 (-1.336)	-0.033 (-0.717)	0.013 (0.334)
MUN POBLACION	0.156 (0.363)	-0.199* (-1.806)	-0.028 (-0.486)	0.064 (1.331)
RURAL	0.705 (0.456)	0.025 (0.265)	0.032 (0.662)	0.105*** (2.611)
RURAL x TRAVELPOB	45.221 (70.745)	-0.0001 (-0.287)	-0.0005** (-2.051)	-0.001*** (-2.759)
RESBGY (5+)	0.852 (0.345)	-0.110 (-1.277)	0.007 (0.161)	0.050 (1.335)
CAM SUR	0.599 (0.490)	0.074 (0.833)	0.032 (0.704)	-0.027 (-0.703)
ALBAY	0.255 (0.436)	-0.013 (-0.133)	-0.099* (-1.941)	-0.071* (-1.645)
PPARITY (3-4)	0.240 (0.427)	-0.121 (-1.283)	0.092* (1.900)	0.005 (10.120)
PPARITY (5-6)	0.202 (0.402)	0.184 (1.610)	0.142** (2.405)	0.044 (0.888)
PPARITY (7+)	0.315 (0.465)	0.414*** (3.214)	0.189*** (2.858)	0.113** (2.017)
AELEC	0.391 (0.488)	-0.151** (-2.193)	-0.019 (-0.533)	-0.005 (-0.157)
IRRIG	0.545 (0.498)	-0.131** (-2.205)	0.058* (1.900)	0.026 (1.018)
HOUSE	0.584 (0.493)	0.161** (2.511)	-0.146*** (-4.413)	-0.059** (-2.130)
Constant		1.344	0.269	0.061
R ²		0.325	0.144	0.069
F		23.444	8.879	4.463
n		981	981	981
Mean		0.431	0.431	0.200
Std. Dev.		0.495	0.495	0.400

a/ Standard deviation in parenthesis.

b/ t-value in parenthesis.

*/ **/ ***/ Significant at the 0.10, 0.05 and 0.01 levels, respectively.

during this period. The coefficient of WAGEW* however is not significant for BIRTHS73 and FPUSEA73, but is significant for FPUSEM73, while the coefficient of WAGEH* is not significant for FPUSEM73.

(2) The coefficient of OWNHOUSE on BIRTHS73 is significant and positive indicating the expected positive wealth effect of non-labor incomes on current fertility.

(3) The age of the woman reckoned in terms of her approximate age at the beginning of the reference period, AGEW73 (i.e., displaced five years from age at interview) is negatively related both with BIRTHS73 and with FPUSEA73 and FPUSEM73 as expected.

(4) The educational attainment of the woman is negatively related to BIRTHS76 and positively related to FPUSEA76 as expected. Its relationship with FPUSEM76, however, is not significant.

(5) Age at marriage, AGEM, is positively related with BIRTHS73 as might be expected if women who marry late tend to catch up on their fertility in the current period. They will therefore be observed to have higher current fertility, although as we have observed earlier, AGEM will eventually be negatively associated with the total number of children ever born. We expect AGEM to be negatively related to family planning use. The positive coefficient of AGEM on FPUSEA76 is therefore unexpected and may be capturing other variables related to AGEM but positively related to family planning use, i.e., more favorable attitude toward contraception arising from experiences prior to marriage; such experiences may include labor force participation.

(6) The areal variables tend to exhibit the same inconsistent pattern as revealed earlier, e.g., family planning use tend to be higher in the rural barangays than in the city/poblacion. However, we note that the practice of modern family planning methods declines with distance from the poblacion. Finally, women in Albay tend to practice less contraception than their counterparts in Camarines Sur and Sorsogon.

(7) Of great interest is the relationship between past fertility on the one hand, and current fertility and current family planning behavior on the other. One would expect that women with higher number of children at the beginning of the reference period would tend to have less births during this period, since these women would already be closed to achieving their desired fertility. Consequently, they are expected to use family planning methods more than their lower previous fertility counterparts.

The results of the regression, however, show that women with higher number of children, PPARITY73, at the beginning of the reference period tended to have more births during the interval 1973-1977. On the other hand, PPARITY73 is positively related to family planning use, FPUSEA73 and FPUSEM73, respectively. What might explain these apparent inconsistencies? Several hypotheses may be suggested. First, the PPARITY73 variable does not take into account child deaths. Higher PPARITY73 women may also have larger numbers of child deaths, hence given the demand for a certain number of surviving children, these women may be observed to be "replacing" these dead children

Table 20

REGRESSION ON FERTILITY AND FAMILY PLANNING PRACTICE
DURING THE 1973-1977 PERIOD, BICOL RIVER BASIN, 1978

Variables	Mean ^{a/}	BIRTH73 ^{b/}	FPUSEA73 ^{b/}	FPUSEM73 ^{b/}
AGEW73 (25-29)	0.241 (0.428)	-0.339*** (-3.196)	-0.080 (-1.466)	0.055 (1.200)
AGEW73 (30-34)	0.215 (0.411)	-0.666*** (-5.411)	-0.221*** (-3.509)	-0.060 (-1.136)
AGEW73 (35-39)	0.205 (0.404)	-1.218*** (-9.026)	-0.250*** (-3.612)	-0.137** (-2.354)
AGEW73 (40-44)	0.201 (0.401)	-2.005*** (-13.976)	-0.490*** (-6.675)	-0.259*** (-4.186)
EDW (5-7)	0.485 (0.500)	0.017 (0.205)	0.069* (1.691)	0.022 (0.651)
EDW (8+)	0.232 (0.423)	-0.280** (-2.178)	0.167** (2.538)	0.054 (0.978)
AGEM	20.238 (4.210)	0.040*** (4.794)	0.008* (1.946)	0.004 (1.210)
OWNHOUSE	0.920 (0.271)	0.246** (2.207)	0.009 (0.159)	-0.047 (-0.981)
OWNLAND	0.126 (0.332)	-0.126 (-1.393)	-0.008 (-0.181)	0.018 (0.452)
MUN POBLACION	0.156 (0.363)	-0.287** (-2.382)	0.043 (0.692)	0.108** (2.075)
RURAL	0.705 (0.456)	-0.156 (-1.335)	0.210*** (3.509)	0.160*** (3.162)
RURAL x TRAVELPOB	45.221 (70.745)	-0.001 (-1.011)	-0.0002 (-0.753)	-0.001*** (-2.622)
RESBGY (5+)	0.862 (0.345)	-0.101 (-1.166)	0.006 (0.133)	0.047 (1.273)
CAM SUR	0.599 (0.490)	0.102 (1.167)	-0.005 (-0.108)	-0.037 (-0.987)
ALBAY	0.255 (0.436)	0.040 (0.408)	-0.149*** (-2.972)	-0.087** (-2.063)
PLIV CHILD73 (3-4)	0.267 (0.443)	0.011 (0.121)	0.112** (2.472)	0.033 (0.854)
PLIV CHILD73 (5-6)	0.225 (0.418)	0.223** (2.050)	0.158*** (2.835)	0.080* (1.707)
PLIV CHILD73 (7+)	0.226 (0.419)	0.505*** (4.024)	0.064*** (2.838)	0.126** (2.322)
WAGEW	-0.100 (0.453)	-0.001 (-0.010)	0.068 (1.261)	0.100* (1.761)
WAGEH	0.481 (0.326)	-0.526*** (-2.840)	0.316*** (3.326)	0.014 (0.171)
Constant		1.616	0.041	0.058
R ²		0.320	0.147	0.069
F		24.031	9.472	4.654
n		981	981	981
Mean		1.417	0.431	0.200
Std. Dev.		1.083	0.495	0.400

a/ Standard deviation in parenthesis.

b/ t-value in parenthesis.

*/ **/ ***/ Significant at the 0.10, 0.05 and 0.01 levels, respectively.

Table 21

REGRESSION ON FERTILITY AND FAMILY PLANNING PRACTICE
DURING THE 1973-1977 PERIOD, BICOL RIVER BASIN, 1978

Variables	Mean ^{a/}	BIRTH73 ^{b/}	FPUSEA73 ^{b/}	FPUSEM73 ^{b/}
AGEW73 (25-29)	0.241 (0.428)	-0.371*** (3.541)	-0.056 (-1.039)	0.057 (1.243)
AGEW73 (30-34)	0.215 (0.411)	-0.704*** (5.779)	-0.200*** (-3.197)	-0.059 (-1.122)
AGEW73 (35-39)	0.205 (0.404)	-1.260*** (-9.418)	-0.227*** (-3.304)	-0.135** (-2.332)
AGEW73 (40-44)	0.201 (0.401)	-2.040*** (-14.346)	-0.468*** (-6.402)	-0.255*** (-4.137)
EDW (5-7)	0.485 (0.500)	0.002 (0.035)	0.109*** (3.019)	0.049 (1.595)
EDW (8+)	0.232 (0.423)	-0.334*** (-3.678)	0.269*** (5.764)	0.120*** (3.044)
AGEM	20.238 (4.210)	0.040*** (4.778)	0.010** (2.327)	0.005 (1.414)
OWNHOUSE	0.920 (0.271)	0.243** (2.188)	0.005 (0.091)	-0.040 (-0.831)
OWNLAND	0.126 (0.332)	-0.125 (-1.383)	-0.033 (-0.708)	0.013 (0.324)
MUN POBLACION	0.156 (0.363)	-0.193* (-1.752)	-0.027 (-0.473)	0.064 (1.338)
RURAL	0.705 (0.456)	0.032 (0.347)	0.034 (0.708)	0.107*** (2.651)
RURAL x TRAVELPOB	45.221 (70.745)	-0.0002 (-0.315)	-0.001** (-2.136)	-0.001*** (-2.791)
RESBGY (5+)	0.852 (0.345)	-0.109 (-1.262)	0.011 (0.239)	0.050 (1.347)
CAM SUR	0.599 (0.490)	0.088 (0.992)	0.032 (0.696)	-0.024 (-0.626)
ALBAY	0.255 (0.436)	-0.010 (-0.098)	-0.102** (-1.997)	-0.070* (-1.633)
PLIV CHILD73 (3-4)	0.267 (0.443)	0.011 (0.120)	0.102** (2.243)	0.029 (0.752)
PLIV CHILD73 (5-6)	0.225 (0.418)	0.226** (2.084)	0.159*** (2.851)	0.078* (1.656)
PLIV CHILD73 (7+)	0.226 (0.419)	0.509*** (4.062)	0.184*** (2.855)	0.122** (2.255)
AELEC	0.391 (0.488)	-0.153** (-2.220)	-0.021 (-0.595)	-0.005 (-0.161)
IRRIG	0.565 (0.498)	-0.134** (-2.260)	0.058* (1.899)	0.025 (0.983)
HOUSE	0.584 (0.493)	0.177*** (2.747)	-0.140*** (-4.247)	-0.056** (-1.994)
Constant		1.313	0.268	0.056
R ²		0.323	0.146	0.069
F		23.301	8.949	4.443
n		981	981	981
Mean		0.431	0.431	0.200
Std. Dev.		0.495	0.495	0.400

a/ Standard deviation in parenthesis.

b/ t-value in parenthesis.

* / ** / *** / Significant at the 0.10, 0.05 and 0.01 levels, respectively.

with current births. To eliminate this possibility, we ran another regression replacing PPARITY73 with the number of surviving children prior to the reference period, PLIVCHILD73. This is shown in Table 19. The effect of PLIVCHILD73 is still positive on BIRTH73 as well as on the two family planning variables. Hence, the potential confounding effect of child deaths is not important.

A second possible interpretation is that women who have had higher fertility in the past would tend to be those women who are more fecund.*/ (Note that we have already controlled for age of women, age at marriage, and demand for children-related variables, but not adequately for supply-related variables.) These more fecund women would then be expected to continue their high fertility into the current period.

Another possible explanation is related to the effect of temporary separation among spouses. All things being equal, spouses who tend to be separated more often, e.g., the husband temporarily migrates to find work, would tend to have lower fertility in the past as well as in the present. Additionally, this type of couple would tend to practice less contraception because there is less need to do so. On the other hand, spouses who are always together will tend to have larger number of children in the past and would tend to continue to do so in the current period.

*/ This interpretation was suggested by Dr. Vicente B. Paqueo.

Finally, there is the possibility that higher previous parity women tend to be women who do not breastfeed their infants, so that birth intervals tend to be shorter. Thus, they will be observed to have more births both in the past and in the current period compared to breastfeeding mothers.

Clearly, the effect of such factors as temporary separation of spouses which might be important in the Bicol context, and breastfeeding on fertility and birth intervals needs to be looked into. In populations which are still characterized by high fertility such as Bicol, the above intermediate variables may have significant impacts on fertility differentials. Unfortunately, the 1978 BMS do not have the data on these intermediate variables as they are related to pregnancy or birth intervals.* We therefore leave this matter for future investigation.

The effect of PPARITY73 or PLIVCHILD73 on the use of family planning is positive as expected. However, the fact that higher PPARITY73 or PLIVCHILD73 women also had more births during the period may indicate contraceptive failure, i.e., the higher recent births occurred in spite of family planning use due to improper use of the method or to discontinued use of the method arising from lack of supplies, side effects, etc. The possibility of simultaneity of relationships cannot be discounted, however. On the one hand, higher

*/ As described in Section III, breastfeeding information was obtained only for living children born during the past two years.

recent births may be due to contraceptive failures among users as suggested above. On the other hand, the greater use of contraception among high previous parity women who continued to have high fertility in the current period might reflect the increased desire for these women to practice contraception precisely to limit their already high past and current fertility. Additional work in determining the simultaneous relationships between births and family planning use is therefore recommended.

Tables 19 and 21 examine the correlates of current fertility and family planning practice using a different specification to highlight the role of rural development efforts. As can be readily noted, both AELEC and IRRIG are negatively and significantly related to BIRTH73 while IRRIG is positively and significantly related to FPUSE73. Furthermore, the use of family planning methods tend to decline with increasing travel time from the rural barangay to the poblacion, suggesting the important role road development can play in improving access to basic services such as family planning services.

Fertility and Family Planning Practice During the Two-Year Period, 1976-1977. The impact of development variables on the most recent fertility and family planning behavior can be examined from Tables 22 and 23. The findings are more or less similar as those found for the period 1973-1977.

Table 22

REGRESSION ON FERTILITY AND FAMILY PLANNING PRACTICE
FOR THE PERIOD 1976-1977, BICOL RIVER BASIN, 1978

Variables	Mean ^{a/}	BIRTH 76 ^{b/}	CFPUSEA76 ^{b/}	CFPUSEM76 ^{b/}
AGEW76 (25-29)	0.190 (0.392)	-0.066 (-0.680)	-0.013 (-0.214)	0.009 (0.165)
AGEW76 (30-34)	0.232 (0.423)	0.199** (-1.964)	-0.043 (-0.506)	-0.059 (-1.080)
AGEW76 (35-39)	0.217 (0.412)	-0.355*** (-3.369)	-0.135 (-1.527)	-0.097* (-1.708)
AGEW76 (40-44)	0.201 (0.401)	-0.666*** (-6.067)	-0.228** (-2.480)	-0.139** (-2.336)
AGEW76 (45-49)	0.122 (0.328)	-0.909*** (-7.953)	-0.367*** (-3.833)	-0.171*** (-2.774)
EDW (5-7)	0.485 (0.500)	0.110** (2.371)	0.030 (0.777)	0.025 (1.016)
EDW (8+)	0.232 (0.423)	-0.072 (-0.949)	0.115* (1.807)	0.048 (1.157)
AGEM	20.237 (4.210)	0.016*** (3.454)	0.003 (0.815)	0.0004 (0.165)
OWNHOUSE	0.920 (0.271)	0.149** (2.261)	0.044 (0.800)	0.041 (1.138)
OWNLAND	0.126 (0.332)	-0.020 (-0.365)	-0.013 (-0.297)	-0.031 (-1.085)
RESBGY (5+)	0.862 (0.345)	-0.023 (-0.455)	-0.027 (-0.619)	0.018 (0.654)
MUN POBLACION	0.156 (0.363)	-0.183** (-2.563)	0.031 (0.522)	0.017 (0.445)
RURAL	0.705 (0.456)	-0.139** (-1.988)	0.178*** (3.053)	0.030 (0.785)
RURAL x TRAVELPOB	45.221 (70.745)	-0.0002 (-0.716)	-0.0001 (-0.271)	-0.0002 (-1.147)
CAM SUR	0.599 (0.490)	0.001 (0.015)	-0.025 (-0.581)	-0.086*** (-3.055)
ALBAY	0.255 (0.436)	0.015 (0.251)	-0.147*** (-2.998)	-0.090*** (-2.858)
PLIV CHILD76 (3-4)	0.282 (0.450)	0.026 (0.469)	0.114** (2.497)	-0.013 (0.432)
PLIV CHILD76 (5-6)	0.261 (0.439)	0.047 (0.749)	0.127** (2.423)	0.045 (1.324)
PLIV CHILD76 (7+)	0.293 (0.455)	0.213*** (3.052)	0.104* (1.774)	0.021 (0.545)
WAGEW	-0.100 (0.453)	-0.062 (-0.788)	0.036 (0.554)	-0.014 (-0.337)
WAGEH	0.481 (0.326)	-0.139 (-1.252)	0.368*** (3.980)	0.080 (1.344)
Constant		0.536	0.0002	0.094
R ²		0.211	0.114	0.045
F		13.445	7.024	3.263
n		981	981	981
Mean		0.527	0.334	0.095
Std. Dev.		0.596	0.472	0.293

a/ Standard deviation in parenthesis.

b/ t-value in parenthesis.

*/ **/ ***/ Significant at the 0.10, 0.05 and 0.01 levels, respectively.

Table 23

REGRESSION ON FERTILITY AND FAMILY PLANNING PRACTICE
FOR THE PERIOD 1976-1977, BICOL RIVER BASIN, 1978

Variables	Mean ^{a/}	BIRTH76 ^{b/}	CFPUSEA76 ^{b/}	CFPUSEM76 ^{b/}
AGEW76 (25-29)	0.190 (0.392)	-0.074 (-0.756)	0.006 (0.072)	0.013 (0.252)
AGEW76 (30-34)	0.232 (0.423)	-0.216** (-2.157)	0.006 (0.073)	-0.050 (-0.920)
AGEW76 (35-39)	0.217 (0.412)	-0.372*** (-3.546)	-0.085 (-0.964)	-0.088 (-1.558)
AGEW76 (40-44)	0.201 (0.401)	-0.685*** (-6.302)	-0.171* (-1.860)	-0.128** (-2.174)
AGEW76 (45-49)	0.122 (0.328)	-0.924*** (-8.132)	-0.322*** (-3.352)	-0.164*** (-2.672)
EDW (5-7)	0.485 (0.500)	0.088** (2.114)	0.064* (1.814)	0.026 (1.152)
EDW (8+)	0.232 (0.423)	-0.134** (-2.479)	0.209*** (4.586)	0.048* (1.652)
AGEM	20.237 (4.210)	0.016*** (3.313)	0.004 (0.976)	0.0004 (0.156)
OWNHOUSE	0.920 (0.271)	0.150** (2.268)	0.032 (0.575)	0.040 (1.109)
OWNLAND	0.126 (0.332)	-0.013 (-0.246)	-0.031 (-0.677)	-0.035 (-1.191)
RESBGY (5+)	0.862 (0.345)	-0.026 (-0.504)	-0.017 (-0.406)	0.020 (0.709)
MUN POBLACION	0.156 (0.363)	-0.138** (-2.102)	-0.034 (-0.620)	0.012 (0.325)
RURAL	0.705 (0.456)	-0.053 (-0.962)	0.011 (0.241)	0.005 (0.162)
RURAL x TRAVELPOB	45.221 (70.745)	-0.0001 (-0.339)	-0.0004* (-1.773)	-0.0003* (-1.693)
CAM SUR	0.599 (0.490)	-0.011 (-0.209)	-0.007 (-0.165)	-0.082*** (-2.865)
ALBAY	0.255 (0.436)	-0.007 (-0.114)	-0.120** (-2.386)	-0.085*** (-2.651)
PLIV CHILD76 (3-4)	0.282 (0.450)	0.027 (0.500)	0.106** (2.311)	0.011 (0.381)
PLIV CHILD76 (5-6)	0.261 (0.439)	0.049 (0.787)	0.118** (2.235)	0.043 (1.273)
PLIV CHILD76 (7+)	0.293 (0.455)	0.213*** (3.057)	0.100* (1.691)	0.019 (0.515)
AELEC	0.391 (0.488)	-0.011 (-0.258)	0.031 (0.899)	0.011 (0.501)
IRRIG	0.545 (0.498)	-0.053 (-1.487)	0.055* (1.828)	-0.0004 (-0.024)
HOUSE	0.584 (0.493)	0.068* (1.775)	-0.084*** (-2.608)	-0.019 (-0.904)
Constant		0.461	0.223	0.152
R ²		0.211	0.101	0.044
F		12.879	5.985	3.073
n		981	981	981
Mean		0.527	0.334	0.095
Std. Dev.		0.596	0.472	0.293

a/ Standard deviation in parenthesis.

b/ t-value in parenthesis.

* / ** / *** / Significant at the 0.10, 0.05 and 0.01 levels, respectively.

Desire for Additional Children and Family Planning Practice.

Tables 24 and 25 present the results of regression on current fertility preferences and current use of contraceptive methods. The sample of women are the same as in the previous case. The period of reference is the time of interview where women were asked about whether or not they want additional children, and whether or not they are currently practicing a specific method of contraception. Our major interest in this analysis is to examine whether current fertility preferences are matched by appropriate contraceptive behavior to effectuate such preferences. We would expect women who report that they desire no more additional children to practice family planning, especially the more effective methods. If they do not, either they are not serious about their desires or that they are unable to practice family planning due to constraints related to lack of knowledge or steady supply of services. The results are summarized below.

(1) Older women tend to desire less additional births but practice less contraception, perhaps due to the belief that they are no longer fecund and therefore no longer need such practice. It might also be that they are unable to do so due to high effective cost of contraception.

(2) Women with larger numbers of surviving children desire less additional births as expected, but they also practice less contraception which is unexpected.

Table 24

REGRESSION ON CURRENT FERTILITY PREFERENCES AND CURRENT USE OF
FAMILY PLANNING METHODS, BICOL RIVER BASIN, 1978

Variables	Mean ^{a/}	ADDCHILD ^{b/}	CFPUSEA ^{b/}	CFPUSEM ^{b/}
AGEW (25-29)	0.135 (0.341)	-0.033 (-0.469)	-0.126 (-1.412)	-0.087 (-1.620)
AGEW (30-34)	0.233 (0.423)	-0.101 (-1.458)	-0.068 (-0.760)	-0.004 (-0.069)
AGEW (35-39)	0.209 (0.407)	-0.114 (-1.577)	-0.140 (-1.500)	-0.054 (-0.969)
AGEW (40-44)	0.199 (0.399)	-0.160** (-2.150)	-0.209** (-2.185)	-0.082 (-1.421)
AGEW (45-49)	0.195 (0.396)	-0.184** (-2.452)	-0.340*** (-3.500)	-0.112* (-1.919)
EDW (5-7)	0.493 (0.500)	-0.042 (-1.427)	0.019 (0.515)	0.006 (0.271)
EDW (8+)	0.229 (0.421)	-0.025 (-0.523)	0.097 (1.587)	0.036 (0.985)
AGEM	20.119 (4.209)	0.001 (0.471)	-0.001 (-0.145)	-0.002 (-0.750)
OWNHOUSE	0.922 (0.269)	0.017 (0.416)	0.001 (0.025)	0.031 (0.972)
OWNLAND	0.129 (0.335)	-0.019 (-0.572)	0.003 (0.072)	-0.036 (-1.388)
MUN POBLACION	0.155 (0.362)	0.051 (1.132)	0.084 (1.459)	0.045 (1.288)
RURAL	0.708 (0.455)	0.092** (2.113)	0.183*** (3.266)	0.032 (0.945)
RURAL x TRAVELPOB	45.729 (70.568)	0.0001 (0.716)	-0.0001 (-0.565)	-0.0002 (-1.145)
RESBGY (5+)	0.857 (0.351)	-0.045 (-1.473)	0.035 (0.853)	0.028 (1.151)
CAM SUR	0.601 (0.490)	0.047 (1.467)	0.007 (0.167)	-0.059** (-2.340)
ALBAY	0.254 (0.436)	-0.029 (-0.806)	-0.088* (-1.885)	-0.059** (-2.096)
LIVING CHILD (3-4)	0.279 (0.449)	-0.284*** (-7.260)	0.141*** (2.791)	0.026 (0.857)
LIVING CHILD (5-6)	0.287 (0.452)	-0.378*** (-9.097)	0.102* (1.898)	0.006 (0.173)
LIVING CHILD (7+)	0.329 (0.470)	-0.427*** (-9.456)	0.093 (1.593)	-0.025 (-0.707)
WAGEW	-0.103 (0.448)	0.045 (0.917)	0.033 (0.522)	0.004 (0.108)
WAGEH	0.475 (0.326)	0.050 (0.728)	0.324*** (3.659)	0.049 (0.912)
Constant		0.516	0.042	0.118
R ²		0.182	0.099	0.045
F		11.696	6.297	3.267
n		1,011	1,011	1,011
Mean		0.163	0.292	0.076
Std. Dev.		0.370	0.455	0.265

^{a/} Standard deviation in parenthesis.

^{b/} t-value in parenthesis.

* / ** / *** / Significant at the 0.10, 0.05 and 0.01 levels, respectively.

Table 25

REGRESSION ON CURRENT FERTILITY PREFERENCES AND CURRENT USE OF
FAMILY PLANNING METHODS, BICOL RIVER BASIN, 1978

Variables	Mean ^{a/}	ADDCHILD ^{b/}	CFPUSEA ^{b/}	CFPUSEM ^{b/}
AGEW (25-29)	0.135 (0.341)	-0.031 (-0.441)	-0.126 (-1.400)	-0.086 (-1.595)
AGEW (30-34)	0.233 (0.423)	-0.094 (-1.355)	-0.045 (-0.501)	0.003 (0.053)
AGEW (35-39)	0.209 (0.407)	-0.104 (-1.434)	-0.109 (-1.162)	-0.044 (0.778)
AGEW (40-44)	0.199 (0.399)	-0.150** (-2.021)	-0.177* (-1.848)	-0.072 (1.253)
AGEW (45-49)	0.195 (0.396)	-0.173** (-2.300)	-0.307*** (-3.151)	-0.101* (-1.731)
EDW (5-7)	0.493 (0.500)	-0.026 (-0.985)	0.047 (1.397)	0.012 (0.594)
EDW (8+)	0.229 (0.421)	0.023 (0.678)	0.181*** (4.147)	0.057** (2.191)
AGEM	20.119 (4.209)	0.002 (0.569)	-0.0001 (-0.022)	-0.002 (-0.800)
OWNHOUSE	0.922 (0.269)	0.014 (0.335)	-0.007 (-0.127)	0.027 (0.838)
OWNLAND	0.129 (0.335)	-0.019 (-0.579)	-0.004 (-0.105)	-0.034 (-1.340)
MUN POBLACION	0.155 (0.362)	.022 (0.546)	0.018 (0.330)	0.032 (1.013)
RURAL	0.708 (0.455)	0.052 (1.492)	0.044 (0.987)	0.013 (0.495)
RURAL x TRAVELPOB	45.729 (70.563)	0.0001 (0.525)	-0.0004* (-1.755)	-0.0002 (-1.523)
RESBGY (5+)	0.857 (0.351)	-0.044 (-1.389)	0.045 (1.105)	0.031 (1.291)
CAM SUR	0.601 (0.490)	0.046 (1.415)	0.013 (0.305)	-0.064** (-2.502)
ALBAY	0.254 (0.436)	-0.026 (-0.714)	-0.072 (-1.501)	-0.064** (-2.241)
LIVING CHILD (3-4)	0.279 (0.449)	-0.284*** (-7.250)	0.140*** (2.759)	0.025 (0.826)
LIVING CHILD (5-6)	0.287 (0.452)	-0.378*** (-9.084)	0.102* (1.889)	0.003 (0.092)
LIVING CHILD (7+)	0.329 (0.470)	-0.427*** (-9.445)	0.092 (1.576)	-0.026 (-0.745)
AELEC	0.386 (0.487)	0.015 (0.576)	0.072** (2.180)	0.024 (1.214)
IRRIG	0.550 (0.498)	0.033 (1.482)	0.029* (1.936)	0.008 (0.453)
HOUSE	0.591 (0.492)	-0.007 (-0.292)	0.031 (-1.894)	0.016 (0.885)
Constant		0.518	0.215	0.128
R ²		0.181	0.090	0.045
F		11.131	5.521	3.158
n		1,011	1,011	1,011
Mean		0.163	0.292	0.076
Std. Dev.		0.370	0.455	0.265

a/ Standard deviation in parenthesis.

b/ t-value in parenthesis.

*/ **/ ***/ Significant at the 0.10, 0.05 and 0.01 levels, respectively.

(3) Rural women tend to desire more additional children and also tend to practice contraception more than women in cities or poblacions.

(4) Neither the wage rates of the husband nor the wife are significantly related to ADDCHILD but the husband's wage is positively related to use of some method of contraception, CFPUSEA.

It would thus appear on the basis of these results that current fertility preferences are not matched by effective use of contraception. Thus, either the desires are not real, or if real, the effective cost of contraception is too high preventing potential users from actually using specific methods. Note the level of contraception in the current period is 29 percent for all methods and only 8 percent for modern methods.

Index of Family Planning Efforts. An important factor influencing the prevalence of contraceptive use is the effort provided by the family planning program. This program is expected to provide information on specific contraceptive methods and providing services to those who desire to practice contraception. How well is the program being implemented in the Bicol River Basin? As a partial answer to such question, we examined below the correlates of one indicator of family planning effort, namely, the extent to which eligible women are visited by a family planning personnel or other government workers who talk to these women about family planning (FPPVISIT). The reference period is 1972-1977, and the data refers

to women who reported being ever visited by a family planning or government worker. Table 26 presents the results of the regression on FPPVISIT.

As the results indicate, family planning workers tend to visit women who are highly educated, women who reside in electrified and irrigated areas, and women in rural barangays. Women who are visited less include those living farther away from the rural barangays and those who are relatively poor as proxied by the HOUSE variable. Interestingly enough, family planning workers do not seem to discriminate between women of different age groups or of women with high or low previous parity. One would expect, for example, that family planning workers would tend to put more efforts on visiting women who already have larger numbers of children. This does not appear to be the case on the average as suggested by our results.

One noteworthy finding, however, is that family planning visits tend to concentrate in rural areas, than in poblacions or in cities, although such visits decline with increasing distance to the poblacion. This may explain the consistent findings earlier which reveal higher family planning use among rural women than women in poblacions or in cities, after controlling for personal and household factors.

Table 26

REGRESSION ON FAMILY PLANNING EFFORTS (FPPVISIT)
BICOL RIVER BASIN, 1978

Variables	Mean	Std. Dev.	Coefficient	t-value
AGEW (25-29)	0.135	0.341	0.075	0.799
AGEW (30-34)	0.233	0.423	0.151	1.590
AGEW (35-39)	0.209	0.407	0.152	1.531
AGEW (40-44)	0.199	0.399	-0.053	-0.518
AGEW (45-49)	0.195	0.396	-0.007	-0.063
EDW (5-7)	0.493	0.500	0.065*	1.812
EDW (8+)	0.229	0.421	0.127**	2.742
OWNLAND	0.129	0.335	-0.087*	-1.894
MUN POBLACION	0.155	0.362	0.035	0.611
RURAL	0.708	0.455	0.088	1.833
RURAL x TRAVELPOB	45.729	70.568	-0.0006*	-2.650
RESBGY (5+)	0.857	0.351	0.029	0.664
CAM SUR	0.601	0.490	-0.053	-1.171
ALBAY	0.254	0.436	0.009	0.183
PPARITY (3-4)	0.234	0.424	0.005	0.107
PPARITY (5-6)	0.196	0.397	0.001	0.013
PPARITY (7+)	0.306	0.461	0.072	1.263
AELEC	0.386	0.487	0.112***	3.147
IRRIG	0.550	0.498	0.067**	2.193
HOUSE	0.591	0.492	-0.056*	-1.711
Constant			0.143	
\bar{R}^2			0.068	
F			4.679	
n			1,010	
Mean			0.361	
Std. Dev.			0.481	

* / ** / *** / Significant at the 0.10, 0.05 and 0.01 levels, respectively.

CONCLUSION

This study on the correlates of fertility and family planning behavior in the Bicol River Basin is part of a larger study aimed at assessing the long term impact of rural development programs in the area. A major survey conducted in 1978 provided most of the baseline data upon which future assessment of impact can be based. The 1983 survey currently being fielded should offer greater possibilities for assessing impact within a dynamic framework. Thus far, our assessment have relied only upon cross-sectional analysis, and inferences regarding impact must necessarily be guarded. The overall results may be summarized as follows.

(1) Analysis of the 1978 BMS demographic data reveal high fertility in Bicol relative to the national average and this finding is consistent with independent estimates obtained by the Area Fertility Surveys of 1979 and 1980 and the National Demographic Surveys of 1968, 1973 and 1978. The relatively low levels of development in Bicol are implicated as creating conditions supporting high fertility in the region.

(2) However, signs of change in fertility and family planning behavior are evident in the data, and that these changes especially in the more recent periods can be directly and indirectly related to the impact of development programs in the area. Thus, we find that rural electrification, provision of irrigation and development of rural road networks are positively related to increased wage rates of husbands

and wives, and that these changes in the wage rates in turn significantly influenced current fertility and family planning behavior as well as child survival rates.

(3) Intensification of rural development efforts in Bicol is clearly needed both to consolidate the gains already achieved as well as to strengthen the region's capacity for self-sustaining economic and demographic development. With respect to family planning efforts, program emphasis might be placed on specific areas and target groups which might have high expected pay-offs. For example, family planning use is consistently lower in Albay than in the other provinces. The pattern of family planning visits do not appear to discriminate between high versus low parity women. Women who report they no longer want additional children are found not to be practicing contraception enough to make their fertility desires effective. Relatively few women reported mass media as a major source of family planning information. Considerations of these findings could provide the basis for strengthening family planning program efforts in the area.

(4) Data from the second round BMS currently being conducted should provide additional information for a systematic assessment of fertility impacts of rural development. This leads us to a consideration of how demographic data may be collected more efficiently in future surveys. With the benefit of hindsight, it would appear that a detailed pregnancy history approach would at once be able to collect information more effectively on all live births, infant and child

mortality, pregnancy wastage, and with possible modifications, on breastfeeding, incidence of temporary separation of spouses, and the timing of the use of contraception. These information should allow more refined analysis of fertility change in a low income setting where biological factors might still be significant factors in determining fertility differentials. Similarly, in the area of impact assessment, the detailed data on pregnancy intervals may provide additional sensitive indicators of emerging patterns of fertility behavior. On the other hand, direct information on current mortality may not provide sufficiently stable estimates, especially of adult mortality, given the limited sample size. Hence, general mortality studies, if desired, may have to rely on data sources other than the BMS. Additional questions on the migration of household members would be extremely useful in understanding the mechanisms by which low income households cope with poverty. Matching of households in two surveys should capture the migration of entire households. Migrant households could then be examined for their characteristics and inferences could be made regarding the determinants of migration in the context of the development programs already in place or yet to be implemented. The prospects for a more systematic assessment of the demographic impact of rural development appears bright. This should lead not only to more information immediately needed for policy and program purposes, but should also lead to a greater understanding of the dynamics of social change in contemporary rural settings.

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