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CHANGING PATTERNS OF FERTILITY: THE
IMPACT OF CONTRACEPTIVE TECHNOLOGY
ON A MAYA VILLAGE

by

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FOREWORD

On Methodological and Ethical Considerations

The field research reported in this paper has been carried out in a spirit of ethical openness and scientific impartiality. Confidences have been respected and the general aims and purposes of the work have been made as clear as possible to all of those who served not as "human subjects," but as participant informants, collaborators and consultants. Frankness, honesty and open communications have been deliberately fostered, both with Chan Kom residents and with agency personnel at local, regional, state, and national levels. Every effort has been made to respect confidentiality (even in the face of villagers' complaints about concealing their identities with false and unattractive names), as we worked with various agencies both vertically and horizontally.

This study, sponsored by the Research Institute for the Study of Man, was funded by the Office of Population, Bureau for Development Support, Agency for International Development under Grant No. AID/pha-G-1184. The field work was carried out in collaboration with Alfonso Villa Rojas.

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I. GENERAL FINDINGS AND CONCLUSIONS

The determinants of fertility change and the acceptance of family planning are complex, interrelated, and difficult to analyze. For example, among those who have accepted contraceptives in Chan Kom one finds:

- the wealthiest and the poorest;
- the young and the old;
- mothers of only one child and mothers of completed families of twelve;
- illiterates who speak only Maya and the most educated, bi-lingual, travelled women; and
- town dwellers and women from isolated, outlying settlements.

Non-acceptors can also be found in each of these groups, which forces one to look for different kinds of indicators or to find some meaningful patterns within subsets of the categories listed above.

Certain clusters of socioeconomic variables do appear to be significant, including:

- continuing contacts with the outside world;
- level of children's education; and
- families who have accepted new technologies in other areas of their life (agriculture, cattle-raising, bee-keeping, e.g.)^{1/}

^{1/} These families are primarily the ones with more capital, so more able to take risks. Also by learning the new technologies they increased their contact with and acceptance of outside agents, so the variables were multiple.

It came as no surprise to find that new and continuing contacts with the outside world contributed to the acceptance of contraceptives, nor that acceptors of other technological changes were prone to accept family planning. Families with husbands or children working in the tourist zones such as Cancun had both increased incomes and increased expectations. Along with the cassette recorders, radios, and other consumer's goods came ideas and awarenesses of strategies for limiting family size, sometimes directly but often through their children.

The impact of the level of education of children did come as a surprise. The apparent explanation for this seems to lie in the double factor of the recent extension of the school system in Chan Kom to include grades five and six, with the introduction into the curriculum of materials on sex education and family planning, demography and subjects of national interest. Considering the evidence that there has already been some upward feedback, from children to parents, it might be possible to further benefit from this situation.

Since Mexico has standard textbooks, with school children all over Mexico (in private as well as public schools) supposedly reading, studying, and learning the same material, the impact of an approach relating parents' learning to their children's new knowledge would have a tremendous reinforcing effect.

But before any new plan is developed, I would urge that the material on population concepts, family life, and sex in the new textbooks for grades one through six be examined carefully, to see how it could be coordinated with other family planning materials, and how its secondary utility -- as a parents' guide -- could be maximized for the Maya area.

In many rural communities the only voluntary organization is the Asociacion de Padres de Familia (Parents Association) which, although in some ways similar to the USA PTA (Parent-Teachers Association) is in other ways more vital, often serving as the only social outlet where people of all ages and sexes meet together. Parents in Chan Kom, as elsewhere, are eager to participate in

educational projects, either literacy classes or lectures, and to know what their children are learning.

These findings suggest the appropriateness of the following three recommendations:

1) Discussion groups about the materials in the new textbooks -- often the only books in the communities -- would be an effective communication medium. In many areas such discussions might start on general topics and then break into separate discussion groups for men and women, related to population, education, sex education, and family planning.

2) Prepared tape cassettes in Maya covering the basic material from the text books could be used by the groups.) Village people are used to listening, to learning from hearing, and are usually intrigued with tape recorders. They learn to use them quickly, particularly when 30-minute messages are the same on each side, thus eliminating the need for rewinding. Consideration must be given to regional and even village differences in taboo subject areas, but now that children are discussing these subjects, as an outcome of the new textbooks, with their peers and their teachers, parents want to understand too.

3) Arrange for distribution to women's groups and/or for home use. Here is an opportunity to make knowledge available to women so that they can design their own ways of sharing it with each other and arrive at family planning decisions based on knowledge rather than on tradition or superstition or ignorance.

Another important consideration is the appropriate time and method of presentation. Over the past two years, the health worker, Elsie Cime, has had long hours of discussion with wives and husbands helping them to choose between alternative methods of fertility control within the framework of traditional beliefs and practices. Much of her effectiveness as an agent of change can also be attributed to the fact that she is also a midwife. By working closely with the local midwives and healers, and by being accepted as a midwife herself (in spite of her

youth and unmarried status), she has been able to accelerate the pace of adoption of contraceptives.

One of her most successful approaches is to use the occasion of a birth, which is traditionally a time for information exchange, to impart much-needed advice and information on fertility control. As noted by Brigitte Jordan in Birth in Four Cultures:

In Yucatan, the woman's husband is expected to be present during labor and birth. They say he should see "how a woman suffers." This rule is quite strong and explicit and we heard of cases where the husband's absence was blamed for the stillbirth of a child. In addition to the husband, the woman's mother should also be there, and mothers sometimes travel considerable distances for their daughters' births. If the labor turns out to be long and difficult, other women will appear: mothers-in-law, godmothers, sisters, sisters-in-law, close friends and neighbors. This group of "helpers" substantially contributes to a successful birth. Jointly and by turns they give the woman the mental and physical support she needs. They encourage her, urge her on, scold her when necessary, always let her know that she is not alone, that the business of getting this baby born will get done. It will take time and work and pain, to be sure, but "we have all done this before and this baby will arrive, soon now." (Jordan 1978:24).

The health worker has used the approach effectively: of the 13 families for whom she has served as midwife, eight are now practicing birth control, using either the pill or the injection.

During the course of our study, it has become increasingly evident that the midwife is the key agent, as well as a vital link between traditional and modern medicine. In Chan Kom, the majority of the village women rely on the services of the three midwives and Elsie, unless serious complications set in. On the whole, the

villagers are hesitant to use doctors in place of midwives because of the expense and fear of being examined by a male physician. Moreover, this fear is compounded by their vergüenza (shame) in having the female genitals exposed. Even the midwives, during delivery, keep the mother covered and do most of their examinations by touch.

Mayan women want fewer children. As long as ten years ago they were asking about birth control. They were also seeking more knowledge of their bodies. What they need to move them to accept contraceptives is information and availability at a cost they can afford, and the information must be presented to them in a culturally acceptable and understandable form.

An illustration of this point, couched in the context of all women rather than of the Maya area alone, was evident at the 1975 World Conference of International Women's Year held in Mexico City where concern for human rights and especially the personal rights of individual women, rather than just for demographic indicators was expressed. The following chart summarizes the relationship of women's aims as contrasted with the components of a traditional population program.

CHART I

Components of Traditional Population Programs Compared to Women's Aims, As Articulated in Mexico

Component	Traditional population programs	Women's aims
Goal	Demographic (reduce societal fertility)	Personal (provide fertility choices)
Justification	Economic (to improve national welfare)	Personal
Operational objective	Motivate target population to adopt small family norm and practice contraception	Ensure access to fertility and infertility services; effect socioeconomic conditions conducive to choice
Means	Persuasion through information, health education, incentives	Relevant information, peer support, economic activities, and alternatives or supplements to motherhood
Structure	Health and clinic networks	Women's organizations and other peer networks

Source: Adrienne Germaine "Beyond Family Planning Acceptors" in Family Planning Perspectives, Volume 7, Number 5, September/October, 1975

The information presented in this chart in many ways reflects the concerns of Maya women and is surprisingly appropriate to those of the Maya women of Chan Kom.

At the Yucatan Family Planning Meeting in October, 1978, Dr. Antonio Garcia Canul, Chief of State Public Health Services, expressed a philosophy for the development of family planning programs which eloquently and concisely sums up much of what will be discussed in this paper.

The woman's free and spontaneous right to decide the number and spacing of her children is closely connected to her full integration into the economic cultural and educational activities of our country. To function so is to socially enrich the life of our country.

To limit the number of children and to space pregnancies, as much as to adopt measures of having the last child at an early age of the couple, is to guarantee to the offspring the food, shelter, clothing, education and recreation which they have a right to and which we are obligated to offer them.

II. INTRODUCTION AND BACKGROUND

Chan Kom

Chan Kom, the main site of this research study, is a rural Maya peasant village in Mexico's Yucatan peninsula, ten years ago reachable only by a two-hour walk on a jungle trail but today just 20 minutes by road from the famous ruins of Chichen-Itza in Piste. Chan Kom is only four hours by bus from Cancun, the newly developed luxury resort area on the Caribbean coast, and three from Merida, the capital of the state. Presently, daily bus service is available to the small city of Valladolid, the area's commercial center and site of the Ministry of Health's regional hospital and of the Coordinating Center of the National Indian Institute (INI).

Chan Kom is well known by many social scientists as one of the sites investigated by Robert Redfield in his classic study of the rural-urban-continuum in The Folk Culture of Yucatan, which was published in 1941. In 1934, with Alfonso Villa Rojas, co-investigator of the present research, he published Chan Kom: A Maya Village, and made a follow-up study entitled A Village That Chose Progress: Chan Kom Revisited, in 1950. Consequently, excellent ethnographic material is available covering a span of 50 years; however, the roles of women are included only as an incidental part of the general research conducted by male ethnographers and their male informants. In order to fill this vacuum, I have made an attempt, over the past decade, to listen in depth to the women of Chan Kom, to try to understand how they feel they have participated in the changes and to let their voices be heard. By learning about the women in this village -- a village that

wants "progress" -- perhaps we can better understand the needs and wishes of peasant women in other rural areas, and ways in which they can help to improve the quality of life for themselves and their families.

Our approach since the inception of the research study in October of 1977 has been to investigate the internal dynamics of the processes set in motion by social, economic, and technical innovations, including the introduction of maternal/child health and family planning services in a Maya village. An unexpected but important dimension of the study lies in the undertaking of research concurrently with the beginning of a family planning program, and the more complex process of introducing contraceptive technology, based on participation of a local health worker so that we could observe how the women used this technology in moving toward more control of their fertility.

Demographic Analysis

Lying inland from the Caribbean beach areas of the Yucatan Peninsula, Chan Kom serves as the county seat of a municipio (township) by the same name with a population of approximately 4,000^{1/} including 17 small, isolated Maya-speaking rancherías and two larger communities. Chan Kom exerts great influence over the other communities in the municipio. Chart II includes a listing of the villages comprising the municipio, and provides a breakdown of the population by age and sex.

Based on data gathered during a household survey which was completed in August 1978, the population of the village of Chan Kom was 623, an increase of 97 persons since a similar survey was made in August of 1976.^{2/} Current population data; based on the 1976 household survey conducted by Elmendorf and Merrill, are provided in Chart III which follows.

^{1/} The official population is 2,771, with Chan Kom having only 367 people. Salvador Rodríguez Losa, La Población de Los Municipios del Estado de Yucatan, 1900 - 1970, Ediciones del Gobierno del Estado: Merida, Yucatan, Mexico, January 1977.

^{2/} Elmendorf and Merrill, World Bank Field Study, mimeograph, 1976.

CHART II
Municipality of Chan Kom

Communities	Number of Inhabitants
1. Chan Kom	367*
2. Chichimila	9
3. Nichte-Ha	93
4. Pamba	34
5. Rancho Nuevo	9
6. San Isidro	53
7. San Prudencio	6
8. Santa Elena	38
9. Santa Rosa Poot	4
10. Tacnil	14
11. Ticimul	239
12. Tzumuc	121
13. Zanlah	195
14. Xbojon	82
15. Xcalax-dzonot	640
16. Xcocail	80
17. Xcopteil	610
18. Xkatun	94
19. Xtohil	68
20. Yaxkax	15
Total	<u>2,771**</u>

Population of the Municipality of
Chan Kom by Sex

Age	Males	Females	Total
0-4	315	176	491
5-9	294	204	498
10-14	229	110	339
15-19	168	121	289
20-24	146	131	277
25-29	106	89	195
30-34	72	74	146
35-39	57	53	110
40-44	50	47	97
45-49	48	49	97
50-54	46	29	75
	<u>1,531</u>	<u>1,083</u>	<u>2,614**</u>

Source: General Population Census of 1970, Vol. III, 1973, Mexico.

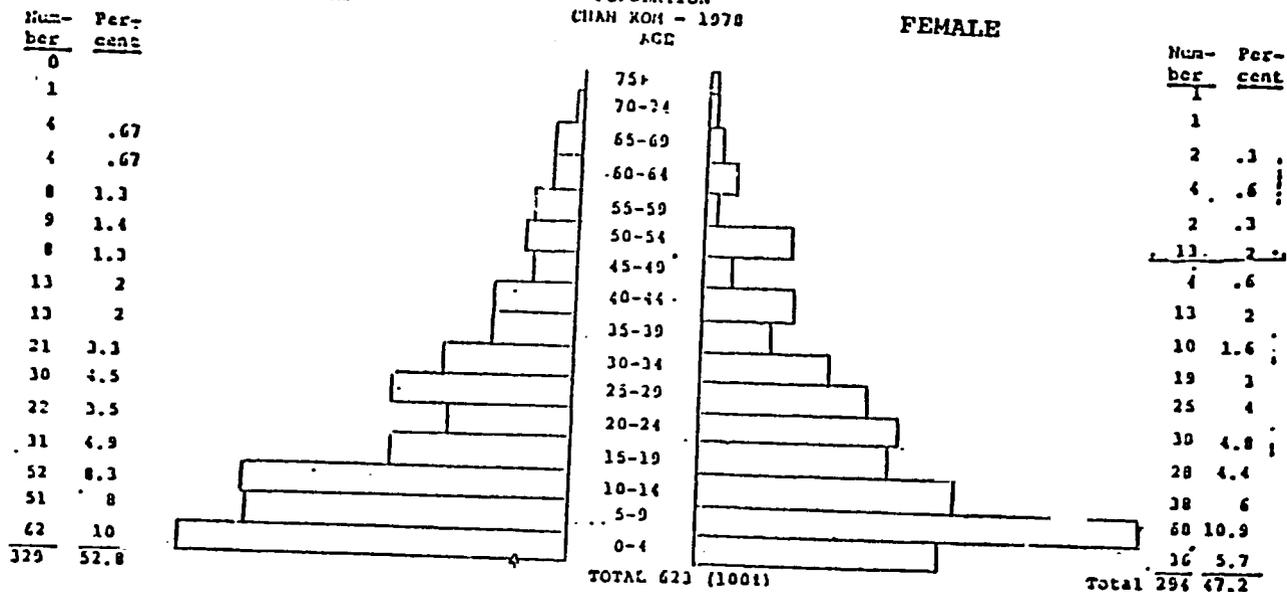
*According to the 1978 household survey, the population of Chan Kom is 623; most of the other communities have increased at the same rate.

**These totals do not match. The 1978 population of the municipality is estimated at over 4,000.

MALE

CHART III
POPULATION
CHIAN XOM - 1978
AGE

FEMALE



	AGE	MALE		TOTAL		FEMALE	
		Number	Percent	Number	Percent	Number	Percent
Pre-school	0-4	62	18.8	98	15.7	36	12.2
School Age	5-14	103	31.3	209	33.5	106	36.1
Total	0-14	165	50.0	307	49.2	142	48.3
Productive Age	15-49	138	42	267	42.9	129	43.9
Old	50-75	26	8	49	7.9	23	7.8
Total	15-75+	164	50	316	50.8	152	51.7
Total		329	100%	623	100%	294	100%

Source: Elmendorf/Merrill Household Survey, August 1978.
Dependency total: [Age 0-14 plus 50 and over] 356 (58%) of total.

The population is now comprised of 981^{1/} households, an increase of 17 over a two-year period.

In Chan Kom, we have defined a household as a living unit with a shared cooking area within a compound or solar as the town lot is called. When married children return to the village for short or long periods and eat from a common kitchen with their parents or others, the family is called extended. If a couple has established a separate residence with kitchen area in Chan Kom, we have defined that family as nuclear. See Chart IV. The membership of the households varies from a man who lives alone to an extended family household of seventeen members. The mean for the number of members in households is 6.6.

Seventy-four of the 98 households consist of nuclear families and twenty-four of extended, of which ten families had two or more young couples living with parents. A number of these couples have secondary residences, both nuclear and extended, outside of the village. Since all of the men except one are still members of the ejido, they are legal residents of Chan Kom.

Of the 623 people in Chan Kom 329 are males, of whom 165 or approximately 50 percent are under 15 years of age and 26 or about 8 percent are over 50, leaving an active adult male population of 138, 42 percent of the total. The female population totals 294, of whom 142 or 48.3 percent are under 15 years of age. Twenty-three or nearly 7.8 percent are over 50, leaving a productive age group of 129 or 43.9 percent of the female population. Of these 129, 97 (or 75) are married women of reproductive age (MWRA). See Chart V.

^{1/} Three of these are new families who were not included in the Household Survey of August 1978, but are in the computer analysis. Two of the husbands work as day laborers in the papaya orchard on the outskirts of town and the third lives in the boarding school as director.

Chart IV

Household Composition of Chan Kom

FAMILY TYPE	Number	Percent
NUCLEAR (husband, wife, unmarried children)	69	70.3
MATRILOCAL (woman and unmarried children)	4	4.1
SINGLE PERSON LIVING ALONE	<u>1</u>	<u>1.0</u>
TOTAL of Nuclear	74	75.4
EXTENDED		
Patrilocal		
1) married couple living with the husband's parents	10	10.1
2) two married couples living with the husbands' parents	4	4.1
Matrilocal		
1) married couple living with the wife's parents	2	2.0
2) two married couples living with the wives' parents	1	1.1
Combination		
1) one married son and one married daughter living with parents	2	2.0
2) one married son and one widower son-in-law living with parents	1	1.1
Stem		
1) widower living with a married son	1	1.1
2) widow living with a married son	<u>3</u>	<u>3.1</u>
Total of Extended	24	24.6
GRAND TOTAL	98	100.0

Source: Household Survey: 1978.

CHART V
Sex Distribution by Age and
Marital Status in Chan Kom
1978

MALE				FEMALE				
Total	Widower	Unmarried	Married	Ages	Married	Unmarried	Widow	Total
31	0	29	2	15-19	9	19	0	28
22	0	9	13	20-24	19	11	0	30
30	0	6	24	25-29	24	1	0	25
21	1	2	18	30-34	19	0	0	19
13	0	0	13	35-39	9	0	1	10
13	1	0	12	40-44	13	0	0	13
8	1	0	7	45-49	4	0	0	4
<u>138</u>	<u>3-3%</u>	<u>46 - 33.3%</u>	<u>89-64%</u>		<u>97^{4/}</u>	<u>31-24%</u>	<u>1-1%</u>	<u>129^{3/}</u>
9	0	0	9	50-54	11	0	2	13
8	1	0	7	55-59	1	0	1	2
4	0	0	4	60-64	2	0	2	4
4	1	0	3	65-69	2	0	0	2
1	0	0	1	70-74	0	0	1	1
<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	75+	<u>0</u>	<u>0</u>	<u>1</u>	<u>1</u>
<u>26</u>	<u>2</u>	<u>0</u>	<u>24</u>		<u>16</u>	<u>0</u>	<u>7</u>	<u>23</u>
164 ^{5/}	5	46	113		113 ^{2/} -74.3%	31	8	152 ^{1/}

GRAND TOTAL. 316

Source: Elmendorf/Merrill, Household Survey, December 1978.

1/ 51% of total female population of 294.

2/ Married women - 74.3% of total adult women.

3/ Women of reproductive age (15-49) - 129 (43.9% of total female population 294)

4/ Married women of reproductive Age (15-49) 97 (75% of Women of Reproductive Age).

5/ 50% of total male population of 329.

Among the most interesting phenomena to have taken place in Chan Kom during the past eight years is the delay in age of marriage. In spite of a long tradition of home supervised adolescence and marriage at or before 17, there has been an abrupt -- not gradual -- change in behavior by the adolescent girls with support from their mothers since the opening of the road in November of 1971. This has been accompanied by employment in low-paying service jobs, and by more education -- even though often limited to two or three years.

The postponement of marriage by a growing number of young women, combined with a growing awareness of alternatives, has potential for rapidly changing the fertility behavior in Chan Kom. In 1971, just as in 1930, there was only one unmarried woman over the age of 17 in Chan Kom. (Elmendorf:1973; 1976). Just as in 1930, marriage was still the state expected of all adults, with both sexes marrying soon after puberty. Marriages were arranged by families, with little or no participation of the young people and often without their knowledge. (Redfield/Villa Rojas - 1934:95).

According to Redfield, the average age of marriage of 25 women in the village in 1930 was 14.9. (Redfield) 1934:95).

Chart VI
Age at First Union
Chan Kom, Yucatan Mexico

Marriage Cohort

Age	1971-80	1955-70	1911-54	Total
12	0	3	2	5
13	1	3	9	13
14	3	11	6*	20
15	3	10*	10	23
16	5	11	6	22
17	5*	9	4	18
18	5	4	4	13
19	4	2	0	6
20	1	2	1	4
21	2	0	0	2
22	1	0	1	2
23	2	0	0	2
TOTAL	32	55	43	130

Source: "CROSSTABS" in CREATION, 1978:20

Median age at first union.

By 1978, the pressures to marry had decreased dramatically. In the past few years, the defined age for a solterona (old maid) has been changed from 19 to 25, and even those who are 25 years of age are still considered "eligible." Of all the women 17 and over in the village, 25 were unmarried in 1978. Thirteen of these unmarried women are under 20 years of age; 11 are in the 20-24 age bracket; and one is 25 years of age.

Of the women aged 15-24 years, only 28 out of a total of 58 (or 48%) are married. Hence, there are more unmarried than married women in an age group where nearly everyone was married or "promised" just nine years ago. This trend is even more pronounced in the 15-19 year old age group in which there are 19 unmarried women compared to nine married. This trend is somewhat reversed in the 20-24 year old category with 11 unmarried and 19 married, but the overall pattern is very indicative of change.

The statistics from CREATION, the Fortran program run by Sharon Kirmeyer using the fertility data from 171 Chan Kom women (the oldest born in 1911), confirm this trend toward delayed age of marriage as having started earlier but with a sudden jump recently, as illustrated in the following chart:

CHART VII

	Age of Marriage Chan Kom, Yucatan		
<u>Year of Birth</u>	<u>1955-1964</u>	<u>1935-1954</u>	<u>1911-1934</u>
Age Group	15-24	25-44	45-68
Median Age of Marriage	19	16	15

Source: "CROSSTABS" in CREATION, 1979:20.

Such a rapid change among a rural population is uncommon since delayed age of marriage is usually related to permanent migration to an urban center, often defined as

100,000 population.1/

The ideal of pre-marital chastity is still predominant in Chan Kom even though there are some exceptions now as there were earlier. Promiscuity is frowned upon. Delayed age of marriage, combined as it is with sexual continence, will undoubtedly reduce overall fertility. Davis and Blake in their classic study listed these as key variables.2/ Along with lowered fertility as a result of less years of exposure, I predict more decision-making power in spacing of children and use of contraceptives as the young village women are exposed to new role models and expand their world view. Within the context of changing roles, however, it is critical that these women maintain their high status within the family and the community.3/

Data from a 1976 study comparing reproductive behavior among rural and urban areas in Latin America4/ show

1/ Patterns of Urban, Rural Fertility Differentials in Developing Countries, Sally E. Windley and Ann C. Orr, GE-TEMPO/AID, 1978.

2/ Davis, Kingsley and Judith Blake "Social Structure and Fertility: An Analytic Framework," Economic Development and Cultural Change Vol. April 4 1956, pp. 211-235.

3/ For a fuller discussion with detailed recommendations, see "Changing Roles and Status of Maya Mothers and Daughters in Relation to Marriage and the Family in Yucatan," a paper presented by Mary Elmendorf at the Annual Meeting of the Society for Applied Anthropology, Philadelphia, Pennsylvania, March 14-17, 1979. (A revised version is scheduled to appear in: Women and Technological Change in Developing Countries, to be edited by M. Cain and R. Dauber and published by Westwood Press in late 1979).

4/ Estudio Comparativo del Comportamiento Reproductivo en Algunas Areas Rurales y Urbanos de America Latina. Adolfo Adunate, PROELCE, Santiago, Chile, 1976.

that the average age of marriage for a rural Mexican was 17.5, as compared to 18.5 for Colombia, Costa Rica, and Peru. Study findings also revealed that 32.4 percent, almost one-third of the rural Mexicans, entered into their first marital union before the age of 16. Thus, we see that the pattern of early marriage is not confined to a remote Maya village in the Yucatan peninsula, but is also characteristic of rural areas throughout Latin America.

Another outcome of this trend will hopefully be fewer infant deaths and less maternal depletion. We do note an increasing age for first birth in our transgenerational sample depicted in Chart VIII. As Newland reports in her investigations of the risks associated with early childbearing,

From 10 to 15 percent of all births in the world -- some 12-18 million a year -- involve teenage mothers. Young mothers, their bodies often not wholly mature, face extra dangers in childbirth and are considerably more likely than mothers in their twenties to give birth to frail babies.^{1/}

This new trend does not mean that marriages of young people are not taking place. In Chan Kom, there are nine married women under the age of 20 who along with the older women of childbearing age, bring the total number of MWRA in Chan Kom to 97. In fact, the young mothers are having babies faster than previous generations.

We note that the birth interval has been decreasing during the past few years in spite of the fact that the young mothers continue to breast feed their babies just as their mothers and grandmothers did. Part of

^{1/} Kathleen Newland, The Sisterhood of Man, Norton/Worldwatch Books, 1979, p. 53.

CHART VIII

Age at First Birth
Chan Kom, Yucatan
Mexico

Marriage Cohort

<u>AGE</u>	<u>1971-80</u>	<u>1955-70</u>	<u>1911-54</u>	<u>Total</u>
12	0	0	1	1
13	0	3	3	6
14	1	3	5	9
15	3	9	6	18
16	0	10	10*	20
17	7	10*	6	23
18	5*	9	5	19
19	1	4	4	9
20	2	5	0	7
21	4	2	1	7
22	3	0	0	3
23	0	0	1	1
25	2	1	0	3
26	0	1	1	2
28	1	2	0	3
30	0	1	0	1
32	0	0	1	1
37	0	0	1	1
38	0	0	1	1
<u>TOTALs</u>	<u>29</u>	<u>60</u>	<u>46</u>	<u>135</u>

Source: 15-17 "CROSSTABS of CREATION: 15-17 - 1978.

the short interval for the 15-25 cohort is due to statistical artifact. Most of the younger women have better food than their mothers and grandmothers. The following chart is based on monthly birth intervals for 116 Chan Kom women who have had more than two children.

CHART IX
Birth Interval (in months) By Age Cohort

Chan Kom, Yucatan

AGE COHORT	MEAN	STDDEV	VARIANCE	NO. OF CASES
15-24	12.50	12.50	156.15	18
25-44	24.39	14.98	224.50	68
45+	24.97	9.95	99.03	30
TOTAL	22.10	14.08	198.17	116

Source: "Break Down" in CREATION: 1979:3.

As indicated in Chart IX, these data for the women are very similar to the average monthly intervals reported for 208 women in Piste by Steggerda in 1941.

Before analyzing in detail the acceptance of contraceptives among the married group, it would seem appropriate to briefly comment on the changing fertility pattern in Chan Kom which partially explains the relatively small percentage of MWRA. Of the 113 married women, 16 are 50 years of age and over, leaving 97 married women of reproductive age. Data related to the age and marital status of women 15 years of age and over are included in Chart X.

Migration

Any demographic analysis of Chan Kom is complicated by the nomadic behavior of the population, in which some of the family members migrate periodically between Chan Kom and other localities as a way to mitigate the economic hardships resulting from crop failure and inflation, others

CHART X
 AVERAGE MONTHLY INTERVAL
 BETWEEN BIRTHS FOR WOMEN IN TWO YUCATAN TOWNS

Interval	Piste		Pencuyut			Average Interval, Both Towns
	No. of Cases	Average Interval in Months	No. of Cases	Average Interval in Months	Total Cases	
Marriage-1st child	11	18.00	62	16.47	73	16.70
1st-2nd	33	24.94	91	25.08	124	25.04
2nd-3rd	31	34.84	74	27.80	105	26.92
3rd-4th	31	24.45	63	27.97	94	26.81
4th-5th	27	23.22	50	28.84	77	26.87
5th-6th	24	27.58	37	29.62	61	28.82
6th-7th	17	30.00	27	32.74	44	31.68
7th-8th	17	27.12	16	28.31	33	27.70
8th-9th	12	27.42	7	30.57	19	28.58
9th-10th	6	32.00	2	36.00	8	33.00
10th-11th	4	30.25	3	25.00	7	28.00
11th-12th	4	30.75	2	38.00	6	33.17
12th-13th	2	35.00	0	2	35.00
Average of all intervals except that between marriage and 1st child						
Total	208	26.18	372	27.99	580	27.34

Source: Steggerda, Morris, Maya Indians of Yucatan, Publication 531, Carnegie Institution of Washington, Washington, D.C. 1941. 215

to broaden their horizons. Chan Kom fits into the "im-balance stage" of migration as described by Lomnitz in her ecological model of the migration process in which there is not yet a break from the village.^{1/}

Fifty (or 36%) of the productive male population of 138 are working outside the village. Of these, 26 are single and 24 are married. Ten of the husbands from nuclear families migrate for work part or all of the time, their wives and children remaining in Chan Kom. (See Chart XI.)

Only one of the men who works out of Chan Kom has given up membership in the ejido. In fact, many have built or are building masonry houses in the village. Even those who have built houses in Cancun continue to maintain a village base. Some 14 men have left their families in Chan Kom and ten others have moved their families with them, but they maintain their use of ejido lands by arranging with their relatives to carry on the traditional slash and burn agriculture.

Economic Factors

This economic pattern has been an important development in Chan Kom. It is basically an exchange or an urban-rural linkage within an extended family. The outside wage earner benefits because he retains his access to ejido lands and receives part of the harvest of the milpa, which is important both for subsistence and as a medium of exchange within the village. The village relatives whom he pays to work the milpa benefit because they receive cash for their labor, as well as a share of the harvest. They are thus provided with an additional economic alternative within the village and with a means for procuring cash without having to leave the village. Viewed as an exchange in currencies, this pattern clearly reflects the rapid economic changes which have occurred in Chan Kom since

^{1/} Lomnitz, Migration and Marginality, 1977.

CHART XI
SEX-DISTRIBUTION OF
UNEMPLOYED
Work-Study/Inside-Outside Village
Chan Kom 1970

MALE						FEMALE					
Inside Village		Outside Village		Total	Age	Total	Outside Village		Inside Village		Total
Work	Study	Work	Study				Work	Study	Work	Study	
1	2	2	2	7	15	1	0	0	0	1	
4	1	2	1	8	16	3	0	1	0	1	
2	0	5	0	7	17	4	2	1	0	1	
0	0	5	0	5	18	8	3	0	4	0	
0	0	1	1	2	19	1	1	0	0	0	
Total	7	15	4	29		19	6	2	4(b)	5	Total
0	0	1	0	1	20	5	1	0	4	0	
0	0	5	0	5	21	0	0	0	0	0	
1	0	1	0	2	22	2	0	0	1	0	
0	0	1	0	1	21	0	0	0	0	0	
0	0	0	0	0	24	4	2 (A)	0	0	0	
Total	1	8	0	9		11	3	0	5(D)	0	Total
1	0	0	0	1	25	1	1	0	0	0	
2	0	1	0	3	26	0	0	0	0	0	
0	0	1	0	1	27	0	0	0	0	0	
1	0	0	0	1	28	0	0	0	0	0	
0	0	0	0	0	29	0	0	0	0	0	
Total	4	2	0	6		1	1	0	0	0	Total
0	0	0	0	1	30	0	0	0	0	0	
0	0	0	0	0	31	0	0	0	0	0	
0	0	1(C)	0	0	32	0	0	0	0	0	
1	0	0	0	1	33	0	0	0	0	0	
0	0	0	0	0	34	0	0	0	0	0	
Total	1	1	0	2		0	0	0	0	0	Total
Total	11(D)	26	4	46 (D)		31 (D)	10	2	9 (D)	5(n) Total	

(A) Both of these young women are continuing their studies parttime.

(B) Three were women work as artisans. The other 5 women plus all of of these help with household tasks, cooking, laundry, child care, etc. as do the ones working and studying outside.

(C) Widower

(D) All of these men are members of the ojido and have access to use of communally owned land. Nearly all plant, or have planted, maize, corn, in their milpas. Many have to supplement this with other income producing activity, inside or outside the village.

the opening of the road in 1971 when the villagers became increasingly involved in the outside world. (See Chart XII).

This pattern which we saw emerging in 1976^{1/} with the new economic alternatives outside the village is in some ways similar to Scarlett Epstein's^{2/} "share family" in which the group no longer lives jointly under the same roof at all times. It involves a number of near kin, agnatic or affinal, who share responsibility for incomes and expenditures.

III. FERTILITY CONTROL IN CHAN KOM

Family Planning Services (August 1977 - December 1978)

In conjunction with the overall Mexican family planning effort, the Ministry of Health (MOH) in Yucatan, through its Division of Maternal/Child Health and Family Planning, established 13 modules of community action, each serving ten communities. The seven modules in the eastern part of state comprised the Programa de Extension de Cobertura (PEC) or extension of coverage of basic health units. Those within the southern section were included under the Programa de Comunidad Rural (PCR). (Dr. A. Garcia Canul 1978).

As illustrated in Chart XIII, Chan Kom is currently part of Module VII, with headquarters in the health post in Piste. The ten communities in its zone of action are: Dzitnup; Ebtun; San Francisco; Xcaladzonot; Chan Kom; Zocenpich; Kaua; Xcopteil; Xcalakop, and Cucunul. Each has an auxiliar de salud, or volunteer health promoter, who receives a modest gratificacion of \$500 pesos (\$22 US Cy) per month. As shown in Chart XIII, which contains official estimated population data from the MOH, the ten

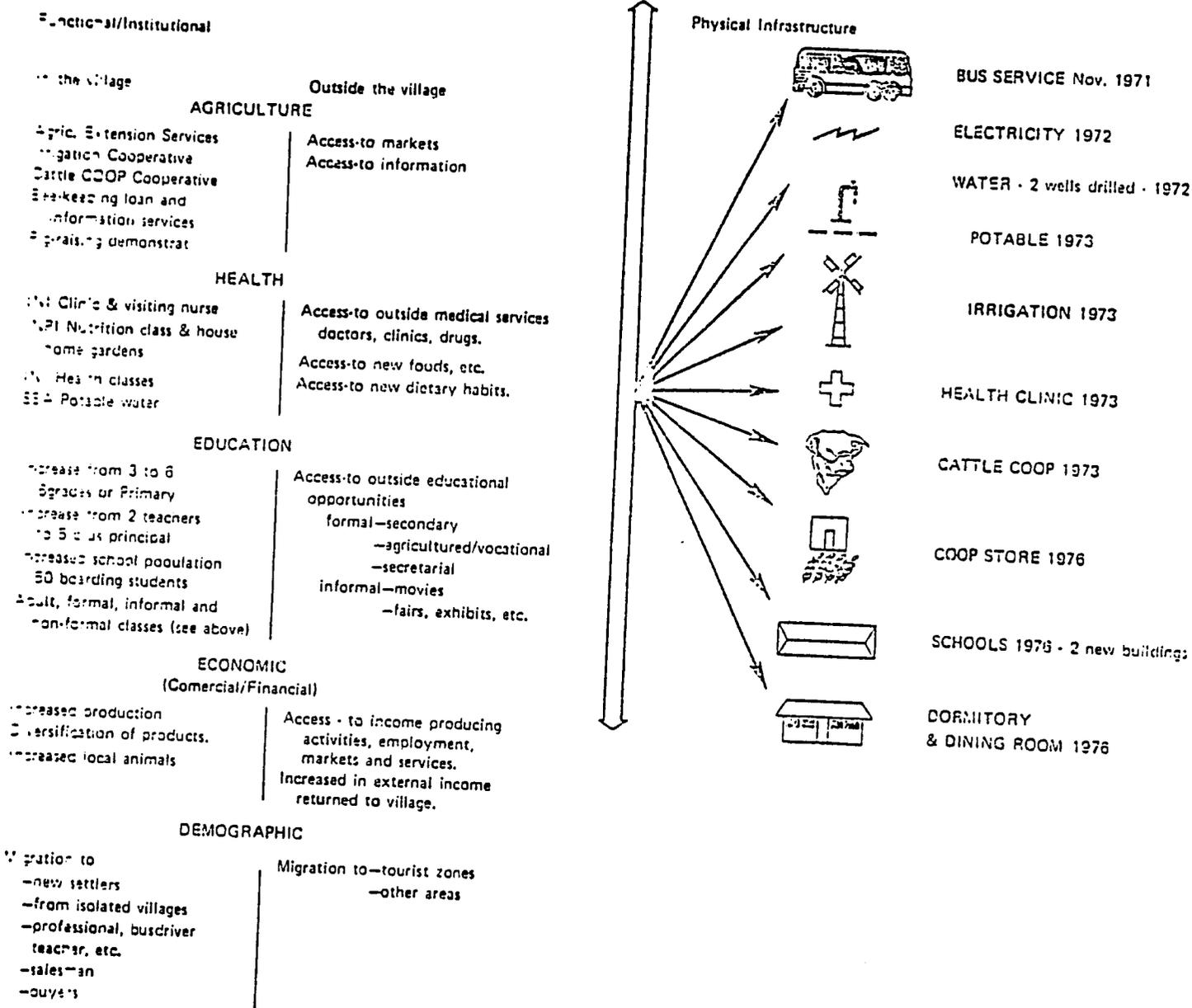
1/ Elmendorf and Merrill, 1978.

2/ Epstein 1973: 207-211.

CHART XII

CHANGES IN CHAN KOM (1971 - 1976)

OPENING OF ROAD - IN THE VILLAGE NOV. 1971

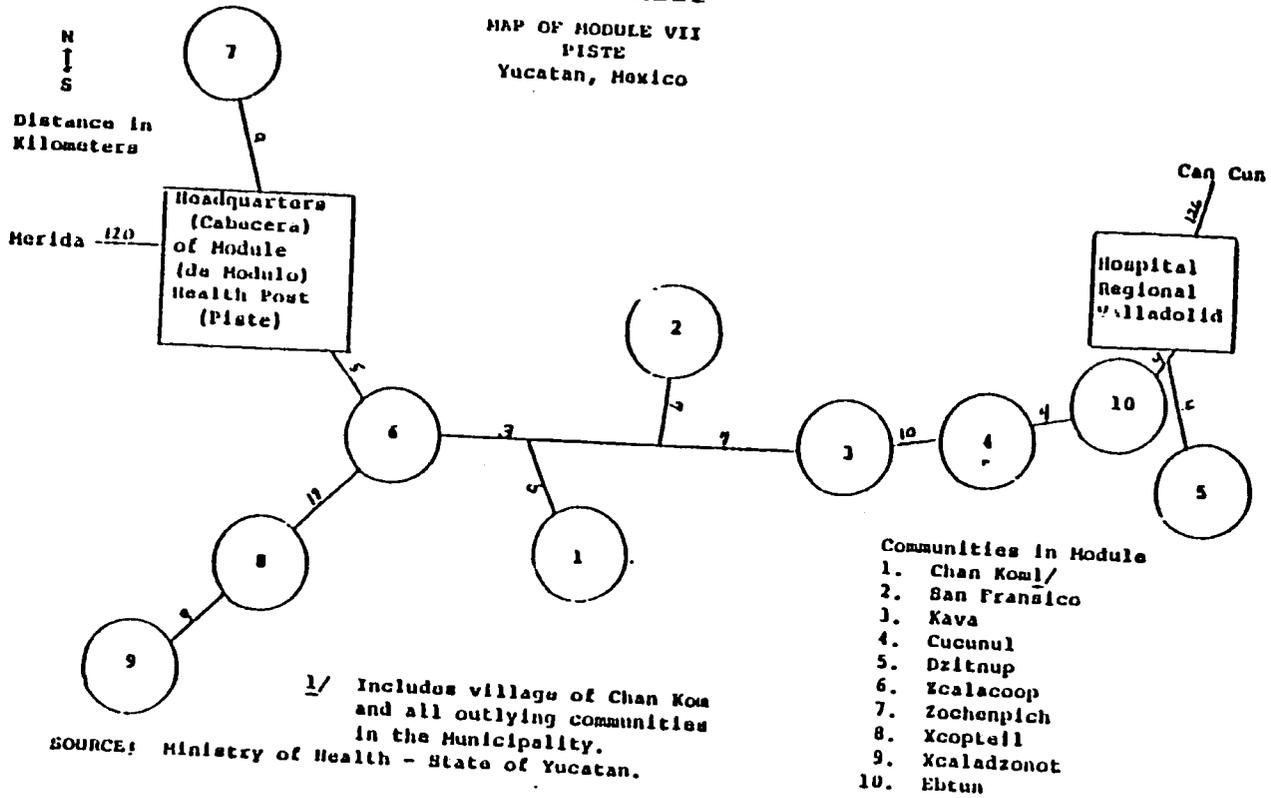


World Bank-17242

Source: Elmendorf and Merrill, 1978.
Additional Changes 1976-1978:

- 1/ Since 1976 various agency representations from the PIDER headquarters in Sotuta have set up field offices in Chan Kom, including the Ministry of Agrarian Reform and Agriculture and Water Resources. Irrigation projects were initiated seven outlying villages in the municipality. In Chan Kom, the Women's Sewing Cooperative has been the primary activity, along with a home improvement project.
- 2/ In August 1977, the village health worker returned from an intensive training course in Family Planning to open a branch of the Ministry of Health's Maternal Child Health and Family Planning program under the supervision of a nurse in the Health Clinic in Piste, and the Regional Hospital and National Indian Institute in Valladolid.

CHART XIII
 MAP OF MODULE VII
 PISTE
 Yucatan, Mexico



communities within the zone of action had 126 acceptors of family planning in 1978. Of these, 95 remain active users of contraceptives.

The Role of the Paramedic

The program's successful outcome in Chan Kom can be attributed in part to the new communication between old and young, including mothers and daughters, and parents and children. The most vital link in the communication network has been, and continues to be, Elsie Cime, the 20-year old health promoter who has been with the program since its inception in August of 1977. Her caring attitude toward and treatment of the families from the more isolated communities who come, usually by foot, to the small clinic for medical help, has also resulted in nine acceptors.^{1/}

Elsie Cime was selected by the villagers as the health promoter to take a three-month course in primary health care offered by INI in 1976 when she was 16. After completing the course, she began providing primary health care services in the village clinic, a small room in the town hall, called the Casa de Salud. In addition to being "on call" at home, she also makes visits to sick families. In 1977, following a brief training course in family planning and midwifery offered by the MOH in Yucatan, she returned to the village to explain and offer family planning assistance as part of the extension of coverage of the Ministry's maternal and child health services.

The MOH strategy for promoting family planning in the rural areas has been to provide volunteer health workers such as Elsie with a dozen medicines (the ability to provide injectables) to treat the most frequent ailments. These medicines are available from the clinic at cost and the health worker restocks her supplies after reporting on use at a monthly meeting of health workers in the regional hospital.

^{1/} More than in larger communities with a full time health promoter. (See Chart XIV.)

CHART XIV
BIRTH CONTROL ACCEPTORS IN
UNIT VII, PISTE
MATERNAL CHILD HEALTH FAMILY PLANNING
 Source: Ministry of Health
 (Estimated 1978 Population)

<u>LOCALITY</u>	<u>POPULATION</u>	<u>ACCEPTORS</u>	<u>DROPPED PROGRAM</u>	<u>CURRENT USERS</u> (Dec. '78)
Dzitnup	317	8	7	1
Ebtun	310	4	2	2
San Francisco	133	3	1	2
Zcalakdzonot	805	15	3	12
Chan Kom*	451	32 (23)**	5 (3)**	27 (20)**
Xocempich	478	24	5	19
Kaba	894	11	3	8
Xcopteil	767	4	1	3
Xcalakop	564	10	2	8
Cuncunul	<u>692</u>	<u>15</u>	<u>2</u>	<u>13</u>
<u>Total</u>	5,411	126	31	95

*/ The 32 acceptors were from the municipality of Chan Kom which has over 4,000 people, and includes along with the village of Chan Kom, 2 Bohon, Xanlah, Chichimila, Ticimul and other communities. One resident of Valladolid is furnished with birth control pills in Chan Kom, and is included in the total, and six of the nine other acceptors are from Xanlah.

**/ In the village of Chan Kom 20 of the original 23 acceptors were still active users in December 1978. In addition to this group 7 women had accepted and five continued to use contraceptives from private sources. According to a household survey made in November 1978, the population of the village of Chan Kom was 623, with 97 (75% of 15-49) married women of reproductive age making a 30% acceptance rate with 26% continuing users. Using the 451 Ministry of Health figures the rate would be even higher.

When a mother visits the clinic to receive treatment for herself or her child, Elsie first solves the immediate problem and later initiates conversations regarding family planning to see if she is interested.

I help them out with their immediate health problems and then we talk about children. None of them want any more children. More and more of the husbands are talking about family planning and are pleased, not upset, when their wives are taking care.

During such visits, the woman is also told that birth control pills are available from the clinic at no cost. In instances where the women are reluctant to visit the clinic, Elsie visits the homes to talk with them about their health and that of their children. Elsie keeps a careful record of each new acceptor, and if anyone forgets to come back for either supplies or an injection, she reminds them. In addition, she follows-up with the new mothers, advising them when they might want to start family planning.

Acceptors in Chan Kom - The Municipio

The community in the Maya zone with the highest percentage of acceptors and continued users is Chan Kom. Of the 32 acceptors in the municipality of Chan Kom, only five have discontinued using contraceptives: By December of 1978, less than 16 months after the family planning services were offered, 23 women or nearly one-fourth of the 97 MWRA, in the village of Chan Kom had accepted the use of chemical contraceptives, primarily oral contraceptives. Two left because they wanted to get pregnant; one transferred to Social Security; one stopped taking the pill because of adverse side effects, and one became pregnant after forgetting to take the pill, and had a miscarriage. The latter is now on Depo-Provera, one of the injectable birth controls drugs available.

Between August and December 4, 1977, the initial four months of the family planning program, two of the first six acceptors were from the village of Chan Kom and four from smaller, outlying communities. During 1978, however, the number of acceptors increased by 26,

21 from the town of Chan Kom, and five from the remote villages in the municipio. The fact that the acceptance rate in the outlying communities has increased at a much slower rate can be primarily attributed to the discontinuation of the bus service.

In addition to the 23 couples on the Ministry of Health program, seven couples from the village of Chan Kom obtain contraceptives from private sources bringing the total number of acceptors to 30. This gives us an overall acceptance rate of 31 percent of the 97 married women of reproductive age in the village of Chan Kom. For a fuller discussion of the temporal and spatial patterns of acceptance, including the acceptors from private sources, see Appendix A.

Acceptors of Family Planning - Preliminary Analysis

A preliminary analysis of a sample of 30^{1/} Chan Kom women using contraceptives (23 on the MOH program and seven on the private program) indicating language and literacy levels, economic status, fertility patterns, age, and contacts with the outside world, reveals some interesting insights. A complete pregnancy history, combined with socioeconomic information from the Household Survey of 1978, as well as data from the Civil Registry, is listed in Appendix B. Appendix B includes full demographic data on 141 married women numbers followed by letters indicating extended families.

In the following chart we note that 62, or nearly half of the 129 women of reproductive age, are not at risk, since 30 are using contraceptives, one is widowed and 31 are unmarried.

^{1/} Thirty women are in the sample. One from Valladolid, not included in analysis of the 29 women.

CHART XV
BIRTH CONTROL ACCEPTORS*
August 1977 - December 1978

Municipality of Chan Kom

1978 Population**	Community	1977 Aug.-Dec.	1978 Jan.-Dec.	Total	Dropped	Current Users
623	Chan Kom	2	21	23	3	20
225	Xanlah	3	3	6	2	4
110	X-Bohon	1	0	1	0	1
285	Ticimul	0	1	1	0	1
13	Chichimila	0	1	1	0	1
2,744 (Estimated)	16 Other Villages	0	0	0	0	0
4,000 (Total estimates)		6	26	32	5	27

*/ Ministry of Health, Yucatan, Mexico.

**/ Household Surveys - Chan Kom - Elmendorf/Merrill: 1978. All other communities PIDER engineers: 1978,

Note: Two of the villages, Xcalaxdzonot and Xcopteil both larger in population than Chan Kom, have community health workers under supervision of the Piste nurse supervisor (see Module VII acceptors).

CHART XVI

Comparison Of Acceptors and
Non-Acceptors in Various Age
Groups in Village of Chan Kom

Women in Chan Kom - Yucatan, Mexico
15+
1978

AGES	MARRIED	UNMARRIED	WIDOW	TOTAL
15-19	9 (3)	19	0	28
20-24	19 (7)	11	0	30
25-29	24 (6)	1	0	25
30-34	19 (6)	0	0	19
35-39	9 (6)	0	1	10
40-44	13 (1)	0	0	13
45-49	<u>4</u> (1)	<u>0</u>	<u>0</u>	<u>4</u>
TOTAL	97 (30)	31	1	129

Source: Household Survey - 1978.

() indicates users of contraceptives in the 1978 sample group.

In analyzing the acceptors of contraceptives, we note that more than 30 percent are 24 years old or under, and that 53.3 percent are under 30 years of age.

CHART XVII
Age of Users of Contraceptives
in Chan Kom, Yucatan

Age	Number	Percent
15 - 19	3	10
20 - 24	7	23.3
25 - 29	6	20
30 - 34	6	20
35 - 39	6	20
40 - 44	1	3.3
45+	<u>1</u>	<u>3.3</u>
Total	30	99.9

Source: Household Survey of 1978.

The age distribution in Chan Kom is very similar to the analysis made of 450 women in an urban clinic in a slum area of Merida, Yucatan. Interestingly, both studies show a high percentage (over 30%) in those women 24 years of age and younger, and more than 50 percent under 30.

CHART XVIII

Age of Patients in a Family
Planning Clinic in
Merida, Yucatan

Age	Number	Percentage
15 - 19	25	5.5
20 - 24	107	24.0
25 - 29	119	26.4
30 - 34	92	20.4
35 - 39	64	14.2
40 - 44	34	7.5
45 +	9	2.0
Total	450	100.0

Source: Canto De Cetina, Thelma. "Características socioeconómicas y Continuidad de las Aceptantes en la Clínica de Planificación Familiar de la Universidad de Yucatan", en: Salud Pública de México, Época V. Vol. XIX, Num. 5, Sept.-Oct. 1977, pp. 686-689.

CHART XIX

Number of Children
of Contraceptive Users
August 1977 - December 1978

Chan Kom, Yucatan

Number of Users	Number of Living Children	Percent
1	0	3
2	1	6
4	2	13.3
1	3	3
2	4	6
5	5	16.6
4	6	13.3
2	7	6
5	8	16.6
3	9	10
0	10	--
0	11	--
$\frac{1}{30}$	12	3
Total		

Source: Household Survey 1978.

These thirty women have a total of 151 living children, an average of 5.03 each, which is much higher than the average of 3.6 reported among patients in a family planning clinic in Merida.

CHART XX

Number of Children of Patients
in Family Planning Clinic in
Merida, Yucatan

Number of Living Children	Percent
0	2.4
1	14.6
2	18.6
3	16.6
4	14.2
5	6.6
6	8.0
7	6.0
8	4.0
9	4.0
10 or more	5.0

nto 77:686.

The number of pregnancies was much higher than that the number of living children in both the village and the urban area, as indicated in the following tables.

CHART XXI

Number of Pregnancies of
Acceptors of Contraceptives

Chan Kom, Yucatan

Number of Pregnancies	Number of Acceptors	Percentage
0 -	0	0
1 - 2	4	13.3
3 - 5	8	26.6
6 - 10	16	53.3
more than 10	<u>2</u>	<u>6.6</u>
Total	30	99.8

Source: Study staff for the project.

In the village 60 percent of the acceptors had had more than six pregnancies with 28.9 percent having had at least eight pregnancies. Although much evidence indicates more early abortions or miscarriages, but they are difficult to verify. Even the reported number was considerably higher than the urban sample.

CHART XXII

Number of Pregancies of
Patients in a Family Planning Clinic
in Merida, Yucatan

Number of Pregnancies	Number of Acceptors	Percent
0	10	2.2
1 - 2	110	24.4
3 - 5	170	38.0
6 - 10	130	28.8
10 or more	30	6.6
Total	450	100.0

Source: Canto 1977:686.

CHART XXIII
MARRIED WOMEN AND NUMBERS OF
LIVING CHILDREN AND CONTRACEPTIVE USERS

USING ALL LIVING CHAN KOM WOMEN IN DATA BASE

Total Number of Living Children	Total Number of Married Women	Total Number of MWRA	Ages of Women	Contra- ceptive Acceptors
0	8	8	15, 17, 18, (21), 23, 23, 24, 55	
1	20	18	17, 17, (18), (18), 19, 20, 21, 21, 21, 22, 26, 27, 28, 32, 40, 42, 52, 62, 71	1
2	20	18	(18), 18, 20, 20, 20, (21), 22, (22), 22, (24), 26, 26, 30, 31, 33, 37, 47, 49, 50, 67	2
3	11	9	(23), 25, 26, 26, 29, 31, 40, 42, 51, 54, 62	4
4	16	14	(23), 23, 23, 25, 26, 26, 28, (29), 35, 36, 37, 42, 47, 48, 54, 59	1
5	17	16	(22), 24, (25), 27, 29, (29), (30), 30, 32, 35, 36, (37), 40, 46, 46, 48, 50	2
6	10	8	(27), 27, (28), (34), 34, 38, (39), 43, 64, 68	5
7	8	4	(29), (30), 30, (44), 52, 57, 59, 59	4
8	12	10	32, (33), (33), 34, 35, (37), 38, (38), (39), 45, 53, 54	3
9	6	5	(34), (36), 42, 44, 45, 60	5
10	1	0	50	2
11	1	0	52	
12	1	1	(44)	
Total	131	109		1 30

Pregnancy History Data: Of the 131 married women, 109 are between the ages of 15 and 49, one is a widow. Eleven were not residents at the time of the 1978 Households Survey. Six older Chan Kom women, for whom full fertility information exists, are included.

Note: Circled numbers indicate contraceptive users.

Age Range of Acceptors

In our sample of 29 contracepting women, ages range from an 18-year old who wants to delay the arrival of her first child, to a 44-year old mother of 12. Of the 22 women on the MOH program in the town of Chan Kom, only five (all under the age of 24) want more children. Until August of 1978, only oral contraceptives and intrauterine devices^{1/} were available. As a result, all of the women involved in the MOH program, with the exception of one, were on the pill until then, but many prefer the injection now that it is available.

Nineteen of the 29 acceptors of family planning are 25 years of age and over, and all have had at least six pregnancies, with five or more children. The six women in the 30 to 34 year bracket have 43 living children, or an average of 7.2 children each. The seven acceptors in the 20 to 24 year old age group include two 22 year olds and the two 23 year olds averaging four pregnancies each. One of the twenty-two year olds has had six pregnancies and has five children and a 13 year old stepson.

Among the three 18 year olds, there are two with one pregnancy, and one who has had three pregnancies, with two children still living.

Parity

Of the 113 married couples in the Chan Kom household survey, there are nine couples without any children. Only one of these is over 24 and she is 55, having become sterile after the birth and death of her first and only child. Both she and her daughter had extremely high fever, possibly from scarlet fever. The child died and the mother lost all her hair, remained very weak for several years, and never conceived again. (See "Victoria," Elmendorf, 1976: 73-75.)

^{1/} The IUD is completely unacceptable to the women in Chan Kom. From our discussions, it seems that this is primarily because of the excessive bleeding, but also due to the fact that it is considered "cold." According to data from a Merida Family Planning, the IUD is acceptable to an increasing number of urban women (Canto 1977).

The other wives range in age from 15 to 24. Four are recent brides, who are pregnant. Three women are afraid they are sterile. One who is only 18, was married at the age of 14, and the others who both married at 18 are 23 and 24 respectively. Another woman, who was on family planning, stopped taking the pill because she wanted to get pregnant, but had a provoked miscarriage (at the insistence of her husband, the director of the Alberque, after she discovered he had another wife). The last, a teacher who married a fellow teacher two years ago, is probably using some contraceptive, but she is not included in our contraceptive group since we have no confirmation.

Of the 19 women with one child, only one is over 45 and four are over 27. Several of these may be involuntarily sterile as are other women in the village. One, now 40, had her second and last child, a daughter at the age of 20 after the death of her first child, a son. She continues to menstruate, but has not become pregnant again in spite of her desire to have more children.

Another (#45)^{1/} now 32, had her first and only child, a son, twelve years ago when she was 20. Following a dangerous delivery she is afraid to have another child, as is her husband, who "takes care" that she does not become pregnant. Very similar to this is the case (#31) of a 42 year old women whose two daughters were born when the mother was 15 and 19 respectively. One died at 11 years of TB and the mother has never become pregnant again. The mothers-in-law in these two families are both herbalists/curers. In fact, Ana's mother-in-law Luz, now 71, also has only one child, a son born 11 years after the death of her first child, a daughter who died at six months. Luz (#45b) who was a secondary wife in the household of the legal wife, was married at 18, had her first child at 26 and last at 35, using rhythm combined with coitus interruptus, and perhaps herbal teas to bajar la regla, regulate menstruation. (See Luz, case 45b.)

^{1/} Refers to household number

One woman (#73) a 27 year old, moved back to Chan Kom from X-Copteil where she went to live with her new husband in 1972 (seven years ago). She has had three sons but the first two died and the youngest is now three years old. A 28 year old working mother (#9c) has her year old son living with her at the school where she is the cook while her husband works on highway construction, both returning to Chan Kom for most weekends and vacations.

The other mothers of one living child are 22 and under with 21 the mode and 20.1 for the mean. Two of these have had one other child who died. One 21 year old mother (62b) who lost her first son at six months in Cancun, is very careful with her second child, a daughter. She is pregnant again, and if this child is a son, does not want any more children. The other mother, now 17, had her first child which died when she was 14 and her second son last year.

The remaining ten couples have all been married within the last three years. Two of these, both 18, want to space their children and are on family planning (11c and 39c). One speaks only Maya and lives in the village, while the other is continuing to work as a maid in a hotel in Cancun, returning to Chan Kom with her non-Maya husband regularly.

Desired Number of Children

As noted by many, social scientists, parents in low-income countries consciously want more children, especially in instances where large percentages of children die before reaching a productive age. Uncertainty and the overcompensation induced are major factors in the common bearing of seven or eight offspring often to assure at least two male survivors.

In Chan Kom, the desired number of children among the younger couples is three, in order that there will be two surviving children -- not two sons, but a boy and a

girl.^{1/} The idea of pairs^{2/} of children, a male and a female, is very strong among the Maya as it is in some other indigenous cultures in Latin America such as the Guajira. Even for the older families, such as one with twelve children, the husband explained that he wanted a son first, but his wife indicated that she had wanted a daughter first. Each wanted to have someone to help with his/her /their share of the household labor.

Sex Preference in Chan Kom

As I noted in 1973, this community has mutual respect for the labor shared by men and women. It is significant to note that each man and woman feels the other has an important and difficult job to perform. For this reason, the status of women is high in the village. In this light, the Mayan pattern parallels the Thai preference to have children of both sexes. As indicated by Newland: "The very mild degree of son preference found in Thailand can be seen as one manifestation of the relatively egalitarian nature of Thai society." (Newland 1979:179).

In analyzing the 1978 data from our household survey, I was surprised to find that of the 100 children under the age of five in Chan Kom, there were only 38 girls and 62 boys. The data in the civil registry's vital statistics indicated that 108 babies were born between 1974 and 1978: 63 boys and 45 girls. Six boys and nine girls died during this same period, leaving 57 boys and 36 girls, or a total of 93 living children. The extra two girls and five boys in the survey were from immigrant families who moved into the village.

Had our research been conducted in a country such as India, we could have ascribed the decreasing number of female births to female infanticide. Sharon Kirmeyer, the demographer who carried out the transgenerational

^{1/} Some couples say five, to have two pairs.

^{2/} The idea of pairs or even numbers is a very strong part of divination. When the shaman throws corn like dice to understand the problem, even indicates good and uneven evil.

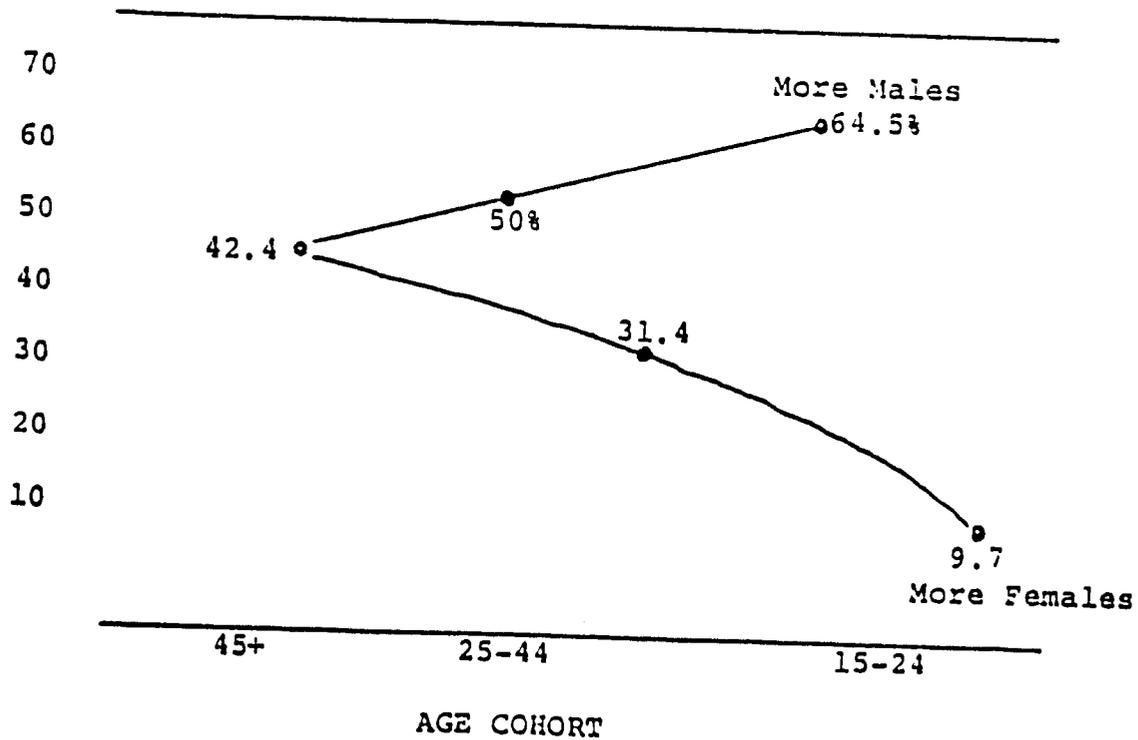
CHART XXIV

SEX RATIO OF CHILDREN BY AGE COHORT

in Chan Kom, Yucatan
Mexico

AGE COHORT

Sex Ratio At Birth	15-24		25-44		45+		Total	
More Males	20	(64.5%)	35	(50%)	14	(42.4%)	69	(51.5%)
Equal	8	(25.8%)	13	(18.6%)	5	(15.2%)	26	(19.4%)
More Female	3	(9.7%)	22	(31.4%)	14	(42.4%)	39	(29.1%)
TOTAL	31	100%	70	100%	33	100%	134	100%



Source: "Crosstabs" in CREATION:22, 1979.

computer analysis, came up with a startling statistic: The grandmothers and great grandmothers, 45 years of age and older, had equal numbers of boy and girl births, whereas the mothers in the 25-44 age group had one-third more boys than girls and the younger ones two-thirds more. (See Chart XXIV.) According to Kirmeyer, the trend is significant and one which should be the topic of further research to determine whether or not this is merely a local phenomenon or more widespread.

Infant Mortality

With respect to our family planning sample group, there was more recorded pregnancy loss and infant death in the 35 and over group, but three women, one 44 years old with 12 children, and two 37-year olds with five and eight children each, report no deaths, miscarriages, or abortions. The other five had a total of eleven fetal losses. In looking at demographic changes in the village over the years we see a trend toward decreasing infant mortality since 1978, but this is a complicated picture.^{1/}

IV. SOCIO-CULTURAL AND ECONOMIC VARIABLES

Language, Literacy, and Learning

Even though our household survey indicated that only five men and 15 women speak no Spanish, to say that 50 percent of the women understand Spanish would be an exaggeration. Maya is the lingua franca in the home, in the fields, and in the small shops. Many ideas can be expressed only in Maya, particularly those related to personal life, including: sex; religion; and body notions.

Of the 29 contracepting women in our sample, 13 speak Maya only and 15 are bilingual (Maya-Spanish), and one speaks only Spanish. Eleven, or half of the twenty-two women participating in the public program, do not understand Spanish, and only five are literate, with

^{1/} For a fuller discussion, see attached statistical breakdown in Accame's "Socio-Economic Variables" and Elmendorfs "Changes of Family Structures and Development: Impact on the Child."

minimal basic skills. Of the seven women on private family planning, four are bilingual; two speak only Maya; and one, the wife of the bus driver, speaks Spanish only. All, except two, can read and write, but none have more than three years of schooling at the primary level.

Existing studies show that education and employment opportunities are both factors inversely correlated with fertility. Most research focuses on secondary or higher education that increases the age of marriage and employment possibilities, and makes women more aware of the opportunity costs of their time. Within the cultural framework of a village such as Chan Kom, no such correlations can be made since only one of the women of marriageable age has more than a third grade education, but new learning is evident.

Educational Level of Children

An interesting correlation with education is revealed with the amount of education of the children of contracepting mothers -- rather than with the mothers themselves. I noted in 1978 that four of the five older mothers, who had not yet reached menopause, were using contraceptives at the encouragement of their unmarried children, all young people who have continued through primary school. This is due in part, I feel certain, to the revised Mexican textbooks which include excellent sections on human sexuality and reproduction for the fifth and six grades. This influence can be considered all the more remarkable when one recalls that none of the mothers of these young people ever discussed sex with their children, or even explained menstruation to their daughters prior to their first period. Sons, as well as daughters, have discussed these issues with both parents as communication related to sexual matters becomes less taboo. In the June 1979 sixth-grade graduating class, there were five Chan Kom girls (four 13-year olds, and one 14-year old) four of whose mothers are now on family planning.

Education-Background

Until 1973, only the first three primary grades were taught in Chan Kom, and then only when the teacher actually decided to walk into the village. In 1971, just after the road opened, two young female teachers arrived, accompanied by their huipil-clad grandmothers, to take over the three grades and by 1976 there were six grades, with five teachers,^{1/} a principal, and two school buildings. Education has received more attention from both the villagers and the federal government since 1976 when an albergue (hostel) was built in Chan Kom. The albergue provides dormitory facilities for fifty students from neighboring villages which have no schools. As a result, the school system has expanded; the village receives better qualified teachers; and attendance in the upper grades has risen.

According to our survey in 1976, 80 percent of the village children were matriculating. Of the 132 students, 80 were male and 52 were female, with the relative proportion of females declining after the first two grades. By 1978 there were 156 students in the primary school, 86 males and 76 females, a significant increase, but still not equal in terms of male-female attendance. (See Chart XXV for information relevant to primary school enrollment in Chan Kom.)

The significant drop-out rate of females continuing after the age of twelve can be attributed to the onset of menses. Earlier, I assumed this was due to a fear of sexual encounters, but I have come to realize that an inordinate fear of menstrual spotting, or manchas, leads to extended absences and/or dropouts. Women do, however, appear to be more interested than men in the education of their children, and in spite of fears and taboos increasing numbers of daughters are continuing their education.

Another factor, which I related both to the delayed age of marriage of the young women and to their

^{1/} Four of them women, including the principal.

SCHOOL ENROLLMENT
CHAN KOM
December, 1978

PRIMARY SCHOOL

GRADE	Overall enrollment			Village Residents		Boarding Students			
	TOTAL	BOYS	GIRLS	BOYS	GIRLS	TOTAL	BOYS	GIRLS	TOTAL
1	49	23	26	19	26	45	4	0	4
2	47	24	23	17	19	36	7	4	11
3	38	25	13	22	11	33	3	2	5
4	22	15	7	11	5	16	4	2	6
5	25	21	4	9	3	12	12	1	13
6	21	15	6	8	6	14	7	0	7
TOTAL	202	123	79	86**	70**	155	37	9	46*

* / Residents of nearby villages who live in National Indian Institute (INI) hostel in Chan Kom during school week to continue primary education.

** / 80.5% of the boys and 66% of the girls in the age group 5-14 are attending.

Source: Chan Kom school registration records, 1978

SECONDARY SCHOOL

	Boys	Girls	Total
Chan Kom - (open-nonformal)	5	5	10
Valladolid - (Escuela Agro-Pecuaría) (LTA)	2	1	3
Cenotillo - (Escuela Agro-Pecuaría) (LTA)	1	1	2
Merida (1 Private, 2 Public)	3		3
Progreso - Escuela Técnica Pescuera	1		1
	<u>12</u>	<u>7</u>	<u>19</u>

* / Still in Primary in school but fifteen years and over are including in the Primary figures above.

NORMAL SCHOOL

Valladolid	1	0	1
	<u>13</u>	<u>7</u>	<u>20</u>

	TOTAL Boys	TOTAL Girls	Total
	99	77	176

mothers' changing fertility patterns, is the continuation of education in special secondary school programs. Seven young women over 13 years of age are continuing their education, two of them joined by eight men in schools outside Chan Kom. One of these young women graduated in June from the Escuela Tecnica Agropecuaria (ETA) in Valladolid and will be attending teacher's college, Escuela Normal, next year. She is the first woman and third person from the village to do so.

Learning

Our intent since the inception of this study has been to look at education in its broadest sense, to include all learning. Informal sources for new information on family planning and human reproduction included: children; the health worker, the nurse supervisor, the Ministry of Health through audiovisual instruction, and even from visiting anthropologists. We were also interested in overall learning and enlarged world view which was greatly accelerated by continuing interaction with persons working outside of the village.

Skill Learning and Artesania

Also of great importance to the women has been improving their skills in sewing and embroidery, and learning more about marketing and production of their products. As hours of work drawing water were decreased and extra hours of light were added with electricity, new, released time was available to village women.

Another liberating innovation was the introduction of a tortilla-making machine in 1977. Even though they pride themselves on their thin white tortillas made from the corn raised in the family milpa, more and more resort to purchasing tortillas if there is a need. And men who cannot make tortillas, may purchase this basic staple if their wives are busy or away.

The opening of the road encouraged the commercial production of embroidery as a significant source of supplementary family income for women. Most of the women, married and unmarried, earn some money doing embroidery.

Every daughter learns to do the traditional cross-stitch before she is twelve and usually makes a huipil, the cool white shift, which is still worn by many Maya women. Nearly all the women also do intricate embroidery on their pedal sewing machines.

By 1974, some of the women started getting cloth and thread from INI in Valladolid, and taking back their finished products for sale, but the prices they received were extremely low. The most accomplished seamstress received so little she gave up her sewing to work as a maid in a tourist hotel. (See Elmendorf, "Changing Roles and Status of Maya mothers and Daughters," 1979). Other women maintain a steady marketing relationship with an outside entrepreneur, who provides them with cloth and buys their finished products.

Although the women are skilled artisans, they receive little payment for their taxing labor. They are reduced to selling their products to entrepreneurs within the tourist industry, who tend to treat them paternalistically, and the relationship often becomes subsumed under fictive kin ties. The women are generally unfamiliar with the workings of the tourist market and direct sales are discouraged in the archaeological zones. But some women have carved out their own entrepreneurial roles within the village, exploiting the rising cost in bus fares and their greater familiarity with business dealings to sell the products of others. Despite the narrow profit margin, many women do continue to produce embroidery for sale since it is one of the few means available to them for obtaining cash -- so important in the households which are still primarily based on subsistence farming and barter.

Since July 1978 the women have been trying to organize a sewing cooperative with representatives of the Ministry of Agrarian Reform. After many meetings, petitions, and planning sessions the women received money in December 1978 for their first order, 45 pesos or \$2.00 (U.S.)^{1/} each for garments which took them 24 hours to

^{1/} Eight cents per hour or 64 cents a day for their beautiful handwork.

make. Even the day laborers in Chan Kom earn 45 pesos a day.

The women have organized themselves into work groups, including both married and unmarried members according to skills and residence. The sewing coop is comprised of 34 married and 14 unmarried women. Nineteen of these women do machine embroidery; thirty do fine cross stitch, and fourteen can do both.

Artesania and Family Planning

All of the women on private family planning own sewing machines, and four market their hand embroidery. Thirteen of the 22 acceptors of the public program have sewing machines and eleven do hand embroidery for sale. In fact, ten of the 31 MWRA who are using contraceptives are members of this newly formed women's sewing cooperative.

Women and Work - General

Unmarried Women: As we noted earlier, 52 percent, or 30 of the 58 women between the ages of 15-24 in Chan Kom are unmarried. Of this group, 26 or 90 percent are occupied in some activity outside of the home. By this, I mean away from the hearth/laundry area, in the public eye at least part of the time, even though all of the women in the village, and most outside, continue to do traditional female tasks in addition to their work. Nineteen are working at paid jobs -- (ten outside the village, nine inside) and seven are studying, two outside and five inside the village.

Married Women Working In Chan Kom: In addition to their embroidery, many of the married women, both those living permanently in Chan Kom and those migrating with their husbands, work in addition to regular household responsibilities. The 32 year old wife of the mayor and his 72 year old mother have set up a "restaurant." One of the widows, with the help of her unmarried children, has kept her deceased husband's store going; the abandoned mother of six small children takes in laundry, helps with fiestas, and another mother bootlegs aguardiente. Several women regularly sell garden produce. Three women work

parttime as midwives but two have been ill and one had to leave town after being accused of witchcraft.

The health promoter is being called in more, but the demand for midwives is decreasing as the birthrate drops. The midwives also continue to be called on to give massages for aches, pains and diarrhea, as are several other masseurs, both men and women. These receive the traditional small fees of five pesos for this service. Another is a specialist in herbal treatment of infant diseases, a kind of pediatric curandera.

Married Women Working Outside Chan Kom: Fourteen of the 24 married men working outside the village in August 1978 had their wives living with them most of the time. Ten of these women are from Chan Kom, and four from elsewhere. Five Chan Kom women are married to outsiders, which gives us a total of 15 married women from Chan Kom living outside the village. These women range in age from 15 to 52.

Nine of the fifteen married Chan Kom women, are working, all except one in Cancun. Four have regular jobs as maids in tourist hotels, two help run family stores; and one takes in laundry and peddles soft drinks. Another woman is working as a cook in an Indian boarding school in Chemax and meets her husband in Chan Kom or when he comes to the school from his highway construction job. Another teaches at the same school as her husband and together they are building their house in Chan Kom. All of the other working women have children except for the teacher, and the 17 year old bride who is pregnant but continues to work in the family store.

Of the four married women working as hotel maids, two are 18 years of age. One of these started using the pill made available at the Chan Kom clinic soon after the birth of her first son in November 1978. The other 18 year old has two children, the 21 year old, one child, the 22 year old, three children, the oldest of whom is eight years of age. As far as we know she is not using contraceptives

nor is her mother-in-law who is a 34-year old laundress in her 18th pregnancy. Seven of her eight surviving children share a compound in Cancun with her and her husband. Two of them are married and work as masons/day laborers as does her husband.

The six married Chan Kom women living outside but not working except inside the home, range in age from a 15 year old bride to the 27 year old mother of five girls. One 24 year old mother of three, whose youngest son died in July 1978 at three months, started Depo-Provera injections at the Chan Kom family planning clinic in August of 1978. The other wives aged 15 and 17 are pregnant, and the 20, 21 and 23 year olds each have one child, and are not on Family Planning.

Wives of "Migrating" Men. At this juncture, it would seem appropriate to provide background information on the ten men whose wives are living most of the time in Chan Kom. Three of the husbands have regular work in tourist hotels. Five work as masons or day laborers. One is on a longterm contract with a construction company, which has just transferred him and the unmarried men working with him from the oil boom areas in Oaxaca and Campeche back to Cancun, to the delight of all of them. Most of the husbands return home every other weekend, and for fiestas and take time off to work and/or supervise their milpas, which many are paying to have cleared and tended. Sometimes this supervision and/or physical labor is done by brothers or fathers.

Two wives, whose husbands' are in Cancun, each have three children. They make visits of one to two weeks to Cancun but prefer to live in the village. Their husbands continue to return to work their milpas and the wives, like most women in Chan Kom, supplement their income by embroidering.

Three of the other village wives of outside workers are on the public family planning program; the 28 year old mother of six and the 29 year old mother of four, both of whom have had eight pregnancies, are on the three month

ion. The fourth who is 33, had eight children
she started taking the pill in December of 1978.

This group of ten wives range in age from 20 to
11 the wives, except for the 20 year old with
and the 26 year old with one, have three or more
children. One has eight, three have six, one five, one
and three have three children. All of these village
except two live alone in the village, and not with
as was the custom in the past. All four on con-
tratives live alone.

Of the 24 married women whose husbands are working
in the village, four of the ten living in the village
are practicing some method of contraception, whereas only
the 14 who live outside are on family planning as
we know. Both of these return to the village for
contraceptive supplies, one is married to an outsider
to a native of Chan Kom.

Household

Nineteen of the 22 couples (86%) on the public
family planning program live in nuclear households. Of
three who live in extended households, with more
one couple, two are from the Protestant group,
one of the head of the household and one, a daughter-

The other couple resides most of the time in
where they are employed, but the 18-year old
came to her family home for the birth of her first
and continues to return to Chan Kom for contra-
ceptives. Her husband is not from Chan Kom. Among the
users only one lives with her mother-in-law,
and her husband started practicing birth control
the mother-in-law's knowledge, and against her wishes.

Other Factors

Of the 291/ acceptors in the town of Chan Kom, many
from the smaller communities -- some had married

from Valladolid gets supplies in Chan Kom making
of 30 in our group.

local boys and some couples have emigrated together. For instance two are from Xanlah, the outlying community which has had the highest number of acceptors in the municipality from communities other than Chan Kom. Two of them are young women, neither of them Protestants, but whose families have been in touch with the Protestant medical clinic which used to have a landing strip in Xanlah before the road was opened. The mother of one was flown in for the birth of her twelfth and last child. The mother of the other is a traditional midwife who has had a training course in Valladolid and has referred difficult patients to the clinics in Piste and in Valladolid. Xanlah had a daily bus service for a few months in 1977, but once again is isolated except for private vehicles willing to drive on the deteriorating road.

Religion

With the exception of one Protestant family, the people of Chan Kom consider themselves to be Catholic although most believe in and perform Mayan rituals and ceremonies. Further analysis also shows some of the most active Catholics among the acceptors. In fact, the husband of the first woman acceptor in the town is the son of the sacristan of the church. Even though they live in a one-room thatched hut, they sponsored the feast of the Three Kings this year at heavy personal expense. This family also continues the traditional Maya ceremonies, offering the foods first to the Maya gods and then to the Three Kings. They also had a ceremony (U-hain-coli) for the Maya bees because of the continuing ill health of their nursing baby, after visits to the SSA clinic and private doctors did not seem to help. (See Elmendorf, 1979c.)

In the village there is one extensive Protestant family the nucleus of a small Presbyterian worship group, called "Mormones" by the community. Of their seven married children living in Chan Kom, five sons and two daughters were among the earliest acceptors. These

families are mostly illiterate and among the poorest in the community, living primarily from the milpa farming. Even though traditional in many of their customs and practices, they do not reject modern medicines or doctors since, as is often the case, some of those who converted them were doctors.^{1/} Also of course there is not conflict with Maya shamans or Catholic priests. One of the daughters (#2) a 37 year old who has eight children lives in a one room thatched hut without electricity or water. Her husband, who is a day laborer, asked her to stop using contraceptives. Her 18 year old sister-in-law (#77) nearly died at the birth of her second child and was happy with her son and daughter, but her husband wanted one more child just in case one died, so she stopped the pill and the third child was born dead.

Housing

There are two principal types of homes in Chan Kom: 1) the traditional, thatched Mayan hut-paja; and 2) houses which are comprised of the paja hut (in which most of the living and cooking activity occurs) and another building of mamposteria, which is a rectangular-shaped masonry building, usually one room with a floor of cement or tile and a roof of wooden beams and stucco. Much of the recent construction of masonry houses has been the result of surplus money brought into the village by those who have gone outside to work.

The mamposteria type house used to be found only on the plaza, but during the last five years its frequency has increased significantly. In 1971, there were 26 masonry houses, of which 22 were on the plaza, while in 1976, there were 37. Houses of mamposteria are a symbol of wealth,

^{1/} See Charles Cheney's essay, "Religion and Medicine in Huave Society" in: From Tzintzuntzan to the "Image of Limited Good," Clark Kemper, and Nelson, editors. Kroeber Anthropological Society, Berkeley, CA, 1979. This relationship with Protestant doctors has probably influenced the Xanlah group as noted in Erogamous factors.

and are usually the first items into which the villagers invest any surplus money. They represent a suitable vehicle for investment because they can be built in increments over an extended period of time, they are highly durable, carry status, and could potentially be used to acquire more wealth by renting. In previous studies, we have correlated the masonry dwelling unit with the "elite" and the wealthier individuals in the community because it reflects the investment of surplus money.

In August of 1978, 58 percent of the households in Chan Kom had at least one completed room of masonry, an increase from 46 percent in 1976. Twelve of the 22 families on the public family planning have homes that are made up of a combination of masonry and thatched rooms. As noted in Redfield's classic study of this Mayan village: "The masonry house is an innovation and a luxury for the progressive and the ambitious; the thatched house is a necessity for everybody."^{1/} Ten or nearly half of the 22 families on public family planning live in thatched huts, six of which provide living, eating and sleeping facilities in one single room.

Only two of the 22 women on public family planning live in houses on the main plaza, while five live nearby and are closely related to plaza families. Thirteen live in the colonia, etc.; the remaining two related to this group live in thatched huts. Sixty-eight percent of the early acceptors are from the non-elite in the village, both natives of Chan Kom and outsiders, all of them from thatched huts in communities without water or electricity.

In the private group, five of the seven live on the main plaza, one just off it. These six are in masonry houses with only one in the colonia in a thatched hut. All of these women except the one in the colonia started family planning prior to the time the MOH established its program, and she, for personal family reasons could not/ did not communicate with the health worker.

^{1/} Robert Redfield, Chan Kom: A Maya Village, The University of Chicago Press, 1934, p. 33.

Water Supply and Waste Disposal

In the village household survey we noted that 36 percent of the families used private running water, an increase from 16 families (or 20 percent) in 1976 to 35 families in 1978. Fourteen, or 64 percent of the 22 families on public family planning use only well water. Two use private wells, two use their neighbor's wells, and the remaining ten draw their water from public wells. Eight or 36 percent of the 22 used piped, potable water, with seven having private stand pipes and one using a public faucet.

Among the seven families on private family planning all but one used piped water. Five have private stand pipes, one uses the public faucet and the other woman draws her water from a neighbor's well. Thus, nearly 50 percent of the women on family planning are using piped water compared to 36 percent of the households as a whole.

In spite of the fact that there is a strong felt need for better sanitation including latrines and/or flush toilets, there is no household with either. The new primary school has two latrines, the old school nothing. The hostel has flush toilets. The new health clinic which was inaugurated in June 1979 has modern plumbing, but the old clinic had nothing. (For details see McGarry and Elmendorf in Elmendorf and Buckles, 1978, World Bank, mimeo)

Electricity

The percentage of households using electricity decreased from 73 percent in 1976 to 70 percent in 1978, while the total number of households increased from 81 to 95 during this same period. Installation charges preclude the use of electricity by many of those who have built their homes recently.

Of the 22 households in the public program, 16 or 73 percent have electricity, which is approximately the same percentage as that for households in the village with electricity. Only two of the 22 on the MOH program have refrigerators.

Six of the seven families on private family planning have electricity. Four own refrigerators; two have television; six have radios and either record or tape players as well. These are the elite. Six, or only 21% of the public acceptors have radios.

Income-generating Activities Within the Village

Apiculture: The single greatest new source of income for the village is honey, which brought in over half a million pesos in 1977-78. There are 29 people owning from one to 200 hives of bees in 28 households. Eleven wives of the bee owners are on family planning with three in the private and eight in the public program. Seven of these eleven households also have members working outside the village.

Cattle: Another newly revived activity is livestock raising. Twelve households in Chan Kom own two to 55 head of cattle, and nine others are members of the cattle cooperative. Of the households owning private cattle, four are on family planning, one private and three public. All of these households also own bees, and only one does not have household members working outside Chan Kom. Two of the members of the cattle coop are in the MOH Family Planning program.

V. REPLICABILITY

As we consider the implication of our findings, one of the questions most often asked is: "Is Chan Kom typical of other Maya communities?" Despite the fact that this is "the village that chose progress," its relative isolation and strong, traditional Maya culture in many ways have helped this village to maintain its pride and identity.

Identity, in fact, plays a very important and largely unrecognized part in some development situations. Often the kind of behavior adopted in a village or in any group is closely related to the image this group has of itself. If the image stresses an identification with the outside world, an environment suitable

for development is created There will be agreements to change local customs.1/

In Chan Kom, modernity and tradition are not perceived as being radically contradictory. Chan Kom is not atypical in that most of the traditional beliefs and practices are shared with the Yucatec Maya throughout the peninsula, and with their Maya neighbors throughout Meso-America. Not only are the Maya different, but Yucatan as a state pride itself on its differences and evidence suggests that it will require a different family planning program approach more culturally suitable for the peninsula.

Zone of Influence

Chan Kom, as county seat (cabecera municipal) of an area of more than 400 people including 19 other communities, has continuing influence and contact with the more isolated families who come in to make official requests, to celebrate fiestas, to make purchases and to register their births and deaths. It is seen as different, but not as foreign. For many other communities, even outside the municipio, it has become a model. Redfield and Villa Rojas noted this influence in the 1930's.2/

VI. RECOMMENDATIONS

- That pilot projects be started in Chan Kom and tested for replicability in other areas, including:

.1) Simple innovations such as the issuance of an identification/health card for each new baby at the time the parents come to register it in the Civil Registry, a card which could then be taken to the local clinic where the health promotor could enter height, weight, etc. on the card and note them in MOH records, explain about infant care and feeding, including inoculation and discuss

1/ Pitt, David D. Development from Below: Anthropologists and Development Situations, Mouton, The Hague, 1976.

2/ Redfield, Robert, and Alfonso Villa Rojas. Chan Kom: A Maya Village, Chicago: University of Chicago Press: 1934

family planning with the new parents, including its availability in home village;

- That existing MCH/FP services be extended to outlying areas by providing transportation to health worker/nurse supervisor or, by arranging cooperative transportation plans with technical staff, engineers etc., of the various development projects;

- That larger projects such as agri-business, canneries, or sewing cooperatives bringing needed income to the area be tried out as a means of utilizing local human and physical resources.

- That further study be made of the advent of modernization/development which, though it creates pressures for a money economy and for the dissolution of traditional values etc., also produces counterforces, which if observed, understood and nurtured can have positive effects, including:

- expansion of learning and a broader world view, but simultaneously increased use of shamans and revitalization of traditional cultural/religious practices.

- refusal to give up ejido lands, return to village, pendulum, rather than definitive migration.

- delayed age of marriage, but without increased sexual promiscuity.

- active search for village or regional solution to need for household income to supplement swidden agriculture.

- a) by the men - bees, cattle, new crops;

- b) by the women - sewing cooperative.

o That every effort be made by development agencies to respond to the desire on the part of many villagers to improve their lives in the rural areas without having to migrate to urban slums by:

o establishing small cooperatives and other businesses in the area with management training and transportation included along with other skill training;

o reaching out to more isolated villages to extend benefits and cut down on costs, both to agencies and the cooperatives; and

o providing controls so that benefits reach the villagers and are not misappropriated by intermediaries. (See sewing cooperative - quarterly Report - June 1979).

APPENDIX A

Spatial and Temporal Patterns of Acceptance

In reanalyzing the rate of acceptance of contraceptive methods, we see that there were six acceptors between August and December of 1977. Two were from the village of Chan Kom and four from smaller, neighboring communities in the township. It is important to note that during this time there was daily bus service to Chan Kom from neighboring villages, a service which has since been discontinued. In spite of the fact that most of these women from outlying villages have to walk three to five hours in order to obtain their supplies, all of them have continued using the pill.

In 1978, the number of acceptors in the municipality of Chan Kom increased by 26, 21 in Chan Kom itself, and five from the remote villages. Three women^{1/} started using contraceptives in January, followed by a steady increase during the summer months (two in June, three in July, and three in August) which continued throughout the year (with three in September, three in October, two in November and two in December). In the outlying communities, the acceptance rate has increased at a much slower pace. This is due partially to a lack of contact with the health promoter who has been extremely active in Chan Kom, and whose mobility has been limited, as has theirs, by lack of transportation.

Since January 1978 there have been five new acceptors from other villages in the township -- two from Xanlah, one from Ticimul, and one from Chichimila. By the end of 1978, there were nine women from isolated communities using the pill, to whom the health worker gave a three months supply in advance. The total number of acceptors in the municipality as a whole by December 1978 was 32, with 23 in the village of Chan Kom. All 32 of these women are under the supervision of the nursing supervisor of Module VII, who comes into Chan Kom once every two weeks from the local health post in Piste, but she rarely sees the women in the isolated communities, since she also has no transportation. (See Chart XIV for data concerning birth control acceptors in the municipality of Chan Kom from August 1977 to December 1978.)

^{1/} One woman, a relative of the bus driver, is not included in our survey but is in the Ministry of Health count.

Acceptors in the Village of Chan Kom

In the village of Chan Kom there are an additional seven couples who obtain contraceptives supplies from private sources, and who, combined with the 23 on the Ministry of Health program, bring the total number of acceptors to 30. Since there are only 97 married women of reproductive age, or 75 percent of the 15-49 age group, this gives an overall acceptance rate of 31 percent for all acceptors, or 24 percent for those on the MOH program. Only three women on the MOH program dropped out and two of the private users, leaving 25 contracepting women in the village of Chan Kom in December 1978.

Acceptors from Private Sources

In the village of Chan Kom, the first woman known to have used mechanical or chemical means of contraception is now 23.1/ At the age of 15, she gave birth to her first child, and has since had one miscarriage as well as two live births. In 1975, following the birth of her third daughter, she traveled by bus to Valladolid to have the intrauterine device (IUD) inserted by a private physician. This was the first and only IUD used in the village.

Six women started using contraceptives in the Fall of 1976 prior to the availability of public family planning services, and were joined shortly thereafter by a seventh. Of these, four have seven children; one has five; one, six and the other, three. Two of these women have had ten pregnancies and only one, who has three daughters, wants another child.

While completing their field work in the summer of 1976, Elmendorf and Merrill made several trips to the hospital in Piste with sick children and their parents. While at the hospital, two couples took advantage of the opportunity to discuss various contraceptive methods

1/ Interestingly, the mother of this young women has had 18 pregnancies, with eleven children born and eight still living.

with the gynecologist. As a result of these discussions, one couple chose the Depo-Provera injection and the other, the pill. The first woman, then a 25 year old mother of seven, has continued to be given an injection every three months by her husband who purchases the medicine in various drug stores. During the past three years, however, she has not had a follow-up examination. Invitations extended by myself to return with the couple to the hospital in Piste for a medical follow-up have been refused by the husband, who says that he has "everything under control."

The other woman, who was 37 at the time, almost died during the delivery of her last child, who is now three. She has had ten pregnancies, two of which were terminated by late miscarriages, and one, her second child, died in 1961. Both she and her husband were, and are, afraid for her life should she give birth again. At their request, I took them to the clinic in Piste in 1976 to discuss their alternatives. Since the couple wanted no more children, the doctor recommended sterilization for her because of her age and the dark blotches on her face which indicated a liver condition. Due to a fear of surgical procedures, however, both found this to be unacceptable method of fertility control.

This wife says that her husband knows how to cuidar her, by which she means they practice abstinence and coitus interruptus. Although the husband has discussed a vasectomy with a visiting Maya-speaking couple who reported their satisfaction with this alternative, he has taken no action. In fact, he has spoken with pride recently of his numerous children, eight by his present wife and four by his first wife. Although never appearing "macho" in his actions, he is nonetheless proud of this "accomplishment."

Three of the other couples using contraceptives from private sources discussed various birth control techniques with me (along with appropriate technologies for stoves, latrines, etc). Since they had access to private transportation, they did not, however, ask to be taken to the private clinic, nor did we discuss details of their private decisions. I know, however, through side comments and other informants, that two of the women used

three-month injections, one at the urging of her adolescent sons. The other woman used monthly injections of Permutal a while but discontinued after her physician in Merida treated her for an ulcer of the cervix.

The seventh woman, the only one from this group who lives in a thatched hut, has obtained pills through private sources in Valladolid where her daughter is employed as a maid. Interestingly, this woman, who has just started using contraceptives, has difficulty communicating with the local health promoter whose brother is courting her daughter against his family's wishes. With respect to the other private users, they may well have been reticent to talk with the health promoter because she is a younger, close relative, -- the age of their own children. Moreover, all of the women, with the exception of the latter, began using contraceptives before the clinic opened and all are able to afford the cost and private appointments. It is also significant that at least five of the husbands have been actively involved in the decision to use contraceptives.

Communication with the outside world has been more prevalent with this group than with Chan Kom population as a whole. In each of these families, at least one member is working or traveling outside the village. Moreover, children from four of the families have completed primary school and are studying outside the village, and one is the first village person to become a school teacher.

New Acceptors -- 1979

During the first five months of 1979, ten new acceptors started using contraceptives -- five from the village of Chan Kom, and five from outlying areas. The five acceptors from the village are all on the three-month injection, while the five from isolated communities are using oral contraceptives. The husband of a 40 year old mother of 12 walked into Chan Kom from Ticimul asking for information about the pill for his wife and left with a supply. The other four women from the outlying areas aged 23 and 24, (each with four children) and 32 and 36, (with six children each) had all originally

clinic to obtain medication for their families, children accompanying them.

five new acceptors in Chan Kom, one is the health worker, who started the injection the marriage, explaining that she and her husband are able to support their children and be free of starting their family. Two are women who were captives from private sources, one, a 23 year old girl, had the IUD removed because of bleeding. The other transfer, a 29 year old woman had started using the pill in 1975 in Merida after the birth of her fifth child, and had continued after their return to Chan Kom to build their

ten new acceptors, only one woman wants a family, beside the 20 year old health worker whose family is two, a boy and a girl, and is planning a family with this hope in mind. Since the date for analyzing our village data was December 1979, information on 1979 acceptors was not included in the analysis, but the private acceptors are covered in the data.

APPENDIX B

Married Women - Fertility and Fecundity Old and Young Users of Contraceptives

The following series of charts includes a list of all married women by household number showing their present age, age at union, and age of first and last born children, total number of children born by age and sex, followed by socioeconomic data. The 30 women who accepted contraceptives are listed on Chart B-I. Data on the other married women in the village are included in Charts B-2 through B-4.

In the material prepared for the computer analysis, exact date of births of mother and all children, as well as of deaths and unions, are included for 141 married women. These women include all of the 97 married women of reproductive age as well the old Chan Kom women. Eighteen other married women "partial residents" who were not in Chan Kom at the time of the household survey are included and coded to their household of origin. In order to get maximum trans-generational data, information on seven women now dead was also coded. Household numbers followed by letters indicate extended households or family origin. The fertility of the women can be noted in Chart XXI, which lists them by number of living children and indicates users of contraceptives.

MARRIED WOMEN IN CHAN KOM
 Demographic and Socio-Economic Data
 Listed by Household Numbers

House No.	AGE AT				TOTAL				CHILD LIVE		CHILD DEAD		MARRIAGE STATUS	CHILDREN										COUPS					
	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956		1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972
33	38	35	32	29	6	6	6	3	3																				
34	31	28	25	22	1	1	1	1																					
350	45	42	39	36	10	9	7	5	4																				
358	47	44	41	38	1	1	1	1																					
35C	24	22	20	18	5	5	5	4	1																				
36A	53	53	54	54	11	11	8	3	5	3	1																		
36B	29	28	27	26	2	2	2																						
36C	22	22	20	18	1	1	1																						
37	55	54	53	52	1	1	1																						
37A	42	41	40	39	3	3	3	2	1																				
37B	33	32	31	30																									
37A	57	55	54	53	8	8	7	2	5		1																		
42	34	34	34	32	8	6	6	4	2			2																	
43	36	35	34	33	4	4	3	2	1																				
44A	36	35	34	33	5	5	5	4	1																				
44B	22	21	20	19	2	2	2																						
45A	32	31	30	29	1	1	1																						
45B	31	30	29	28	2	2	1				1																		
46	31	30	29	28	6	6	2	2		1	3																		
47	36	35	34	33	5	5	4	2	2																				
48	50	49	48	47	9	9	5	3	2	3	1																		
49	44	43	42	41	10	10	4	5	4		1																		
50A	41	40	39	38	6	6	3	1	2																				
51A	46	45	44	43	7	7	5	3	2	1	1																		
51C	41	40	39	38	6	6	3	1	2	2	1																		
51D	33	32	31	30	1	1	1																						
52A	41	40	39	38	2	2	2																						
52B	33	32	31	30	1	1	1																						
53	40	39	38	37	12	11	6	3	3			4																	
54	40	39	38	37	2	2	2																						
55	43	42	41	40	7	7	6	2	4		1																		
56	46	45	44	43	8	5	3	2	3	4																			
57	46	45	44	43	2	2	2																						
58	33	32	31	30	7	5	2			2																			

34
 *Have moved out of Chan Kom

MARRIED WOMEN IN CHAN KOM
 Demographic and Socio-Economic Data
 Listed by Household Numbers

# House No.	AGE AT			TOTAL			CHILD		m	n	CHILDREN	D	W	R	C	P	T	V	L	C	O	O	P		
	18	21	24	18	21	24	18	24																	
59	18	18	18	5	5	4	2	2	1	-	⊙	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
60	17	21	24	4	2	2	1	1	-	2	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
61A	54	22	23	8	8	8	3	5	-	-	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
61B	24	18	19	5	5	5	3	2	-	-	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
62A	42	15	16	4	7	5	2	3	1	1	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
62B	21	15	19	3	2	1	-	1	1	-	Δ	Δ	+	-	-	-	-	-	-	-	-	-	-	-	
62C	17	17	-	1	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	
66	32	15	16	8	8	8	4	4	-	-	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
67	30	14	25	4	4	2	2	-	2	-	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
68	56	16	11	2	2	1	1	1	-	-	Δ	Δ	-	-	-	-	-	-	-	-	-	-	-	-	
69	27	14	15	6	6	6	3	3	-	-	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
70	21	16	16	3	2	2	1	1	-	-	Δ	Δ	+	-	-	-	-	-	-	-	-	-	-	-	
72A	42	13	15	11	9	7	6	3	-	2	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
72B	18	14	15	2	2	2	1	1	-	-	Δ	Δ	-	-	-	-	-	-	-	-	-	-	-	-	
73	21	21	22	3	3	1	1	-	2	-	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
74	16	14	20	5	2	2	-	2	-	3	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
75A	18	16	17	12	4	3	3	3	3	-	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
75B	17	17	-	-	-	-	-	-	-	-	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ
78A	52	11	13	11	4	5	6	-	-	-	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
79	21	14	15	5	5	4	3	1	1	-	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
80A	31	12	13	9	4	8	3	5	1	-	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
80B	15	15	-	1	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	
81	12	17	18	5	4	4	1	3	-	-	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
82A	17	16	17	9	9	7	3	4	1	2	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
82B	16	23	25	1	1	1	-	1	-	-	Δ	Δ	-	-	-	-	-	-	-	-	-	-	-	-	
83A	34	15	31	3	3	3	2	1	-	-	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
83B	23	15	16	4	4	4	3	1	-	-	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
84	23	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
85B	21	18	21	1	1	1	-	-	-	-	Δ	-	-	-	-	-	-	-	-	-	-	-	-	-	
87	21	20	21	3	3	3	3	-	-	-	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
88	35	17	19	5	5	4	1	3	1	-	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
89	40	17	18	3	3	2	1	2	-	-	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
91	51	18	19	7	7	4	3	-	2	-	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
92	24	18	20	4	4	4	3	1	-	-	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
94A	42	17	18	7	7	4	1	3	2	1	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	
94B	67	20	21	6	6	2	1	1	3	-	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	Δ	

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TOTAL NUMBER OF MARRIED WOMEN 131 — 97 "permanent" residents and 34 migrants.
 MIGRATED PERMANENTLY 3 — 18 "partial" residents.

APPENDIX C

Computer Analyses of Changing Fertility Patterns

Several tables in this paper were taken from CREATION, the Fortran program designed by Sharon Kirmeyer for this study. This computer program summarizes the variables from the pregnancy history of individual women into such tables as parity, gravidity, age at first union, age at first birth, sex ratio, birth intervals, and pregnancy intervals, by generational and marriage cohorts.

In order to analyse the economic data, the Statistical Package for the Social Science (SPSS) computer program was used by Jorge Accame in this paper (Appendix A-3). This program provided tables on the frequency distributions of economic variables such as type and number of rooms, household composition, electricity, water source, family planning acceptance, types of contraceptives, number of cattle, beehives and place and type of employment.

The following tables were generated by the PREGHIST program. PREGHIST is a computer program designed by Jeanne Cairns Sinquefield, called "Pregnancy History Program: Conventional and Nuptial Rates (Miniversion)", modified by Sharon Kirmeyer for its application to our data. The program provided tables on exposure of women years, birth and death rates, as well as fertility rates. The "A" tables provide frequency distributions while the "B" tables are rates. The codes are:

Z=1978	First column = five year cohorts
Z=Q=1978	
Z-2=1977-78	
Z-4=1975-78	
Z-5=1974-78	
Z-10=1969-73	
Z-15=1964-68	
Z-20=1959-63	
Z-25=1954-58	
Z-30=1949-53	
Z-35=1944-48	
Z-40=1939-43	
Z-45=1954-38	

TABLE = A- 1 PREG HIST PROGRAM
 TABLE-5 YEAR INTERVALS=MARITAL EXP FOR TOTAL WOMEN 330.

	TOTAL	Z- 5	Z-10	Z-15	Z-20	Z-25	Z-30	Z-35	Z-40	Z-45
TOTAL	2075.	493.	421.	345.	254.	201.	150.	107	67.	29.
15-19	424.	63.	67.	65.	53.	33.	40.	39.	31.	29.
20-24	499.	112.	91.	73.	40.	62.	42.	36.	35.	0.
25-29	400.	95.	79.	58.	50.	40.	37.	32.	0.	0.
30-34	291.	72.	61.	54.	36.	37.	30.	0.	0.	0.
35-39	211.	60.	55.	35.	32.	29.	0.	0.	0.	0.
40-44	147.	54.	35.	31.	28.	0.	0.	0.	0.	0.
45-49	98.	30.	32.	20.	0.	0.	0.	0.	0.	0.

Z = 1978

	TOTAL	Z-0	Z-2	Z-4
		100.	205.	107.
15-19		11.	27.	24.
20-24		22.	48.	42.
25-29		7.	39.	36.
30-34		15.	20.	29.
35-39		12.	26.	23.
40-44		11.	23.	20.
45-49		8.	14.	16.

The results are in months, in five year intervals for the total women and and for age specific women.

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