FERTILITY IN MEXICO: TRENDS AND FORECAST

Rodolfo Tuiran*, Virgilio Partida*, Octavio Mojarro*, Elena Zúñiga*

"When I cannot satisfy my reason, I like to second it with my fantasy." Thomas Browne

"At the moment, the destiny of the world depends, in the first place, of the statistics and, in second place, of the interpreters" Trygve Lie

This document examines the levels, trends and differentials of fertility in Mexico during the last three decades, as well as its main determinants. Also, with the purpose of identifying some regularities of this process of change, the study explores the variety of regional experiences regarding the onset of fertility decline. The document also analyzes briefly some of the determinants of fertility and identifies the characteristics of the population residing in the municipalities which are about to reach, that have already reached or that are below the replacement level.

Based on these elements, the document speculates about the future evolution of fertility in Mexico, trying to identify some preliminary conclusions regarding those factors that could determine if in the short and medium term the level of this demographic variable will continue its decrease below the replacement level or if, on the contrary, it will stabilize above it. The document concludes discussing the assumptions on the evolution of fertility on which the population projections of Mexico rest, as well as the results derived from alternative scenarios.

DEMOGRAPHIC TRANSITION IN MEXICO

In the new millennium, Mexico experiences an intense process of change that implies multiple transitions in the economic, social, political, urban, epidemiological and demographic spheres. The country is advancing in these transitions, although it will take some time to conclude of each of them.

The demographic transition is a process that almost all the countries of the world have undergone, and it refers -in general terms- to the transit from a regime with high and uncontrolled rates of mortality and fertility to another with low and controlled rates. As it is well known, this process is far from being uniform, both among countries and within them. The study of patterns and modalities of the demographic transition in a wide variety of countries have shown important differences in the onset, pace, the duration of the process, as well as in the time elapsed from the decline in mortality to the decrease in fertility.

Mexico advanced significantly in this process of change during the twentieth century, a fact that was reflected in the intense population growth registered between 1930 and 1970, as well as in its significantly slower rate during the last three decades. It is estimated that the demographic dynamic grew from 1.7 per cent in 1930 to 2.7 per cent in 1950 and to 3.5 per cent in 1965. Since that year, as a

^{*}National Population Council, Mexico.

consequence of the fertility and mortality decline, the demographic dynamics began to gradually decelerate, registering a rate of 3.3 per cent in 1970, of 2.6 per cent in 1985 and of 1.7 per cent in 2000 (see figure 1). As can be seen, after a long period of demographic transformation, the Mexican population entered the new millennium with a natural increase rate similar to the one observed 70 years ago, but with a population six times bigger.

The demographic transition in Mexico had a notable impulse since the thirties -in a context of deep economic, political and social reforms-, when a rapid and sustained decrease in mortality took place. In those years, life expectancy reached 36.2 years (35.5 for men and 37.0 for women), while at the present time almost 75 years (73.4 years for men and 77.9 for women). The fall in general mortality has been of such magnitude that the global reduction of the risk of dying, accumulated from 1930 to 2001, is equal to 83.7 per cent among men and 86.5 per cent among women.

FERTILITY DECLINE IN MEXICO

Fertility decline did not begin in the country until the mid-sixties. Levels stayed high and even rose before the onset. Let us remember that families had around 6 children at the beginning of the twentieth century, reaching a maximum of 7.2 children during the early sixties. The gradual spread of family planning practices contributed to impel the fertility transition in the country.

Three stages in the process of fertility decline in Mexico can be observed: (i) the first phase—of initial descent—that covers the period 1964-1973, when a fall in the total fertility rate (TFR) of almost one child (with an annual average decline of 0.09 children) took place; (ii) the second phase -of accelerated decline- from 1974-1984, when the TFR decreased almost two children (with an average yearly decline of 0.20), in a narrow chronological association with the establishment of a new population policy; and (iii) the third phase -of moderate decline- that spans from 1985 to the year 2001, when the TFR diminished in around 1.8 children (with an average yearly decrease of 0.10 children, equivalent to half the speed of the reduction observed in the eleven previous years). Thus, fertility registered an average of five children per woman in 1978; then fell to four children in 1985; afterwards decreasing to three children in 1993 until reaching around 2.4 children at the present time (see figure 2). As can be seen, the Mexican experience, as well as that of other countries, shows that once the fertility transition begins, the rhythm of decline accelerates rapidly. As fertility reaches lower levels, the additional reductions per year are ever lower.

The fall in fertility has implied significant reductions in the intensity of the second birth interval onwards, especially among women that began their fertility during the mid-seventies¹. The reductions initially involved women of high parities and were followed a few years later by women with lower parities². Thus, it can be noticed that the proportion that closed the interval from the first to the second child changed from 92 per cent among women who began it in 1957, to almost 70 per cent among those who began that interval in 1992. More notorious variations can be found in the cohorts of women that completed the transition from the second to the third child in the following five years after the beginning of the interval (of 91 per cent in 1960 to 53 per cent in 1991). The largest reduction was registered in the fourth interval, that shifted from 90 per cent of women that began it in 1960 to 45 per cent among those who started in 1991 (see figure 3).

Besides the rapid decline in the proportion of women with high parities, the "tempo" of fertility also registered some significant changes, except, once again, in the first interval³. If the median is used as indicator of the time that it takes the members of a cohort to complete the transition from one birth to the next, it is possible to notice that the interval from the first to the second child increased from 21 to 27 months between the beginning of the seventies and the beginning of the nineties, while for the following intervals the increase was slightly lower.

As can be observed from this analysis, when fertility was at its highest level -during the sixties- it was frequent that a high proportion of women would move from one parity to the next. The relative parallelism in the reduction of the conditional probability of having an additional child after the first one, as well as the increase in the birth intervals, reflect the gradual generalization of family planning practices in all parities.

If the quintum of the six intervals showed in figure 3 are linked, it is possible to conclude that in 1965 more than half (52 per cent) of women had six children before being married for 30 years. Fertility decline led this proportion to would have to one third in 1977 (17.6 per cent), and to a little less than one fourteenth in 1991 (3.7 per cent).

Another form of examining the changes in reproductive behavior is looking at age. Based on the life tables and the specific fertility rates by parity during the reproductive period (15-49 years) for four different periods, in figures 4 and 5 the final distribution is presented (up to 50 years of age) according to parity, as well as life expectancy at each parity for women aged 15 to 50^4 . The change in the fertility patterns is evident. In 1974, when population policy in Mexico gained importance, almost 60 per cent of all women finished their reproductive life with 6 children or more (the TFR of the period was of almost 6 children) and spent almost 40 per cent of their reproductive life raising children. Ten years later, a more uniform distribution is observed: practically the same proportion that concluded with 3 or 4 children did with 6 children or more; while almost 40 per cent of their reproductive lifespan would be spent without children.

As the fertility transition advances, a lower definitive number of children is more common and women dedicate less time to childbearing. Indeed, while in 1973-1976 a woman invested 22.2 years of her life in the upbringing of almost six children until the last one turned six years of age (a 3.9 year average per child), in 1995-1997 only 14.8 years were dedicated to the care of less than three children (a 5.6 year average per child). This way, while in the beginning of the family planning programs, a child shared with his following sibling half of the time of upbringing from his/her birth until he or she turned six years old, 22 years later this time was dedicated, almost exclusively, to only one child.

FERTILITY PROXIMATE DETERMINANTS

The diffusion of stopping and spacing behavior and the significant increase in the use of contraceptive methods with high effective and continuation rates, has been the main proximate determinant of fertility decline. It is believed that the proportion of married women in fertile ages who use methods to regulate fertility rose from 30 per cent in 1976 to almost 71 per cent in 2000, while unmet demand decreased from 25 to nearly 10 per cent between 1987 and 2000. If the observed tendencies are maintained, we foresee that in the year 2005 little less than three out of four married women in reproductive ages will use some contraceptive method, which would lead–according to the estimates of the National Population Council- the replacement fertility level.

It must be said that the groups that lag behind in the fertility transition show high levels of unmet contraceptive demand. In 1997 this was the case of indigenous women (25.8 per cent of married women in fertile ages), of women that live in rural areas (22.2 per cent) and of the women without schooling (21.8 per cent), whose characteristics refer to social, cultural and geographical contexts that do not allow them the full exercise of their reproductive rights. With the purpose of attenuating the inequalities in this context, population policy has established the intention to reduce unmet demand in the short and medium terms. To accomplish this, it is necessary to increase the access to family planning services, while articulating their operation with wider strategies of social and human development, and alleviation of poverty⁵. It is estimated that a significant reduction in this lag would translate to a national average fertility below replacement fertility.

The changes in family formation and dissolution patterns have also contributed -although in a smaller measure- to impel fertility decline, mainly during the last years, when a gradual delay of the age at first marriage can be observed, as well as an increase in the number of consensual unions -which have a larger break up probability- and an incipient increment of the separation and divorce rates⁶, which suggests that in the future this variable could have a higher weight on additional declines in the fertility levels.

The effect of abortions on fertility decline apparently has not been so significant. Although precise information about the incidence of this practice in the country is not available, it is estimated, based on information from hospital records of the main health institutions of the country, and from sociodemographic surveys, that the abortion rate has declined in the last twenty-five years⁷, as a consequence of the decline in unwanted pregnancies stemming from the increase in contraceptive use. We foresee that the fostering of family planning services, together with education and communication campaigns, directed to foment informed decisions regarding sexual and reproductive health, will continue contributing to reduce the incidence of induced abortions.

Regarding post-partum infertility, derived from the duration of breastfeeding, enough evidence exists to sustain that this practice has not had significant effects on the evolution of fertility. Although its incidence has increased lightly, a reduction of its medium duration⁸ is also observed

FERTILITY DECLINE AT THE STATE LEVEL

Fertility decline in Mexico began in the most developed states of the country, although it extended quickly towards the rest of the states of the Republic. In accordance with available evidence, these states reached, between 1962 and 1965, the maximum TFR, although with dissimilar levels that ranged from 6.3 children per woman in the Federal District and the Baja California state, to 8.1 children in Guerrero, Oaxaca and Zacatecas. The initial reduction of 5 per cent in the TFR took place, between 1968 and 1973, in *all* the states, while the decrease of 10 per cent took place from 1970 to 1975 (see table 1 and figure 6).

If the year in which the TFR in each state reached a level of around 6 children per women is taken as reference, it is possible to conform five groups of states (see table 2):

- The first group crossed that threshold between 1967 and 1970, and it is integrated by the states with a higher relative development, located in the north (South Baja California, Baja California, Nuevo León, Coahuila, Sonora and Tamaulipas) and the center of the Republic (the Federal District).
- The second group reached the threshold between 1971 and 1972 and it is formed by two states of the northwest (Chihuahua and Sinaloa), one of the center (State of Mexico) and another of the south (Quintana Roo).
- The third group accomplished it from 1973 to 1974, and contains four sates of the Gulf (Campeche, Tabasco, Veracruz and Yucatan), one of the center-west (Colima) and another of the center (Morelos).
- The fourth group arrived at that level of fertility between 1975 and 1976, and is conformed by three states of the center-west (Aguascalientes, Guanajuato and Jalisco), one of the center-north (Durango), another of the northwest (Nayarit) and two of the center (Hidalgo and Tlaxcala).
- The fifth and last group crossed that threshold between 1977 and 1979, and it is formed by two states of the center (Puebla and Querétaro), two of the center-north (San Luis Potosí and

Zacate cas), one of the center-west (Michoacán) and three of the south (Chiapas, Guerrero and Oaxaca).

In table 2 and figure 6 one can observe that approximately 12 years elapsed before all the states of the country reached the threshold, from 1967 when Baja California did it, until 1979 when Oaxaca, Guerrero and Zacatecas did it in. The threshold was reached first in the capital city of the country and in the states located on the northern border of Mexico; not long afterwards it was reached by the states located in the Gulf of Mexico and in the northwest, and it extended gradually towards the states of the center, center-north and center-west, until it became generalized in the states located in the south of the country (see map 1).

It is possible to notice on table 2 that the pace of decline of the TFR took place faster in the states that began the fertility transition earlier. Taking into account that all the states of Mexico have already reached a TFR of around 3 children, it is possible to calculate the yearly average of decline starting from 6 children, and to determine the time lapse that it took them to move from one level to the other. This way, the states of the first group were able to change from 6 to 3 children per woman in a 17 year period (from 1968 to 1985), with a yearly average decrease of 0.18 children; the second group (from 1972 to 1991), the third (from 1974 to 1992) and the fourth (from 1976 to 1995) group of states took 18 to 19 years, with an average decrease of 0.16 children; finally, the fifth group, required approximately 20 years (from 1978 to 1998).

On table 2 it is observed that, according with the estimates of the National Population Council, of the 17 states that integrate the first three groups, fourteen of them (Baja California, the Federal District, Nuevo León, Baja California Sur, Sonora, Tamaulipas, Chihuahua, Mexico, Sinaloa, Campeche, Colima, Morelos, Veracruz and Yucatan) have reached a TFR between 1.8 and 2.3 children per woman, that is to say, a level below, equal or slightly above that of replacement fertility, while in the three remaining states (Coahuila, Quintana Roo and Tabasco) it oscillates between 2.4 and 2.6 children. In the last two groups of states, the TFR have reached in levels that go from 2.3 to 3.0 children.

THE STRUCTURAL DETERM INANTS OF FERTILITY

The explanation for the fertility decline in Mexico has shown the role played by demographic and socioeconomic variables, such as:

- *Mortality*, which has been identified as a key variable in the explanation of the fertility transition. Its decline causes an increase in the number of surviving children and thus contributes to propitiate favorable attitudes to fertility regulation and the planning of life course events, as well as to extend and strengthen long term thought in the conscience of all individuals.
- *Diverse forces of a macro-structural character*, among which stand out the processes of economic and social development, urbanization⁹, industrialization, the expansion of the educational system, the process of generalization of mercantile relationships, the expansion of salaried work and the conformation of an ever growing consumption society¹⁰. According to the most conventional explanations, these processes -working through diverse mechanisms--have contributed, like in many other contexts, to increase the direct and opportunity costs of having children, as well as to diminish the economic benefits that parents derive from them, reducing in this manner the incentives for having a large offspring.
- The excluding and divergent¹¹ nature of the development pattern, which gives place to remarkable social inequalities and demographic contrasts, since the mortality and fertility decline speed depends on the society's capacity to distribute the benefits of development among the different sectors¹². This is reflected by the coexistence side by side of groups integrated to the

development process with marginalized ones. Thus, the former already showed, during the 1995-1997 period, a TFR equal or smaller to that of replacement level, whereas the other was a straggler in the demographic transition process. In the first case there were women who had twelve or more years of schooling (and a fertility of 1.85 children), as well as managers, professionals or artists, with 1.66 children per woman. In contrast, women without schooling was of 4.7 children per woman during the same period, and that of women living in rural towns of less than 2,500 inhabitants was of 3.5 children per woman¹³.

More recently, research in this field has contributed to identify some of the causal linkages between large macro-structural forces and other social transformation processes¹⁴. Their consideration contributes to explain why fertility decline could spread throughout the national territory of Mexico in a few decades, and to advance so rapidly in diverse socio-economic contexts, among which we can mention the following:

The growing exposure of the Mexican population to medical culture and authority. This process of change has contributed to promote the secularization of diverse norms and practices that are within the sphere of influence of medical culture. It has also created the conditions to legitimate practices such as the conscious and planned intervention in biological processes. This has resulted in the increasing search by the population for medical attention during pregnancy, delivery and the post-delivery period¹⁵. This growing exposure has also allowed the diffusion of values and norms that establish as desirable the separation between sexual activity and procreation. It has also contributed to weaken the authority of diverse traditional agents who exert influence on the sexuality and reproductive fields. It has also aided to reduce the psychological and cultural costs of fertility regulation, as well as to socially legitimize modern methods of family planning.

The expansion of the mass media sphere of influence and the diffusion of small family models. Massive media, particularly radio and television, has contributed to diffuse new ideas, concepts, technologies, lifestyles and behavior models in spheres linked with the exercise of sexuality, reproduction, family organization and the sexual division of labor, leading at the same time the emergence and consolidation of favorable attitudes and values towards fertility regulation¹⁶.

The growing access of the Mexican population to security and social protection networks. The strengthening of the Mexican social security institutions among the sectors integrated to national development has meant that the responsibility to provide millions of families with the means to face unforeseen events such as illness, disability or death, has been transferred to the government¹⁷. In the same manner, more recently, the government efforts to promote social development and to overcome poverty have enlarged the coverage of social protection nets. They have also strengthened human capital formation among traditionally excluded from development sectors of the population¹⁸. In all these cases, this type of transformations favors, among other things, a decrease in the economic utility of children.

Improvement of the social conditions of women and the transformation of their domestic and nondomestic roles. Diverse studies have shown that the advancement of women in the fields of education, health, labor market participation and degree of control that they can exert on economic resources results in their autonomy and in their establishment of more egalitarian relations with men, as well as in the emergence of a new life-course structure for them¹⁹. All these transformations affect, through diverse mechanisms, decisions of women in regard to sexuality and reproduction and increase the opportunity costs linked to marriage and reproduction.

The adoption and impulse of an explicit population policy. Fertility decline received a strong impulse in Mexico in 1974, when population policy changed. Starting that year, population policy in Mexico acknowledged every person's right to choose, in a free, responsible and informed manner, the number of children that he/she wants to have, and the timing to have them. It also establishes that every person must

have access to information and the necessary means to crystallize his or her reproductive preferences. This change contributed to legitimate and to institutionalize the demand for fertility regulation means, and to enlarge the public's knowledge of and free access to family planning services, putting them within the reach of the majority of the Mexican people.

FERTILITY TRANSITION IN THE MUNICIPALITIES OF THE COUNTRY

The key question that we try to address is whether the Mexican population will initiate a fertility regime equal to, below or beneath the replacement level. In order to speculate on this question, it is convenient, first, to explore municipal level information, which allows us to differentiate municipalities according to their fertility levels, the size of their populations, and their main socio-economic traits (see figures 9, 10 and 11).

Map 2 presents the TFR Mexico's municipalities, stratified in five categories (by means of the Dalenius method). One can observe important geographical continuities and some regional patterns. On the one hand, the low and very low fertility areas are located in the North of Mexico, as well as in the region where Mexico City and other metropolitan areas are interconnected, as well as in the Gulf of Mexico and the Western municipalities. In contrast, the high and very high fertility municipalities are located in the huge corridor that harbors the main concentration areas in the country of indigenous people, and that runs from the south of the Pacific shore to the central-northern region.

The exploratory analysis of the available information at the municipal level shows that the 2 443 political-administrative units that integrate the country:

224 municipalities concentrate 43 per cent of the Mexican population and a TFR equal or below 2.2 children per woman. This group of municipalities is integrated by political-administrative units that: (i) are predominantly urban and metropolitan; (ii) they have low infant mortality with respect to national standards (of around 22 deaths for each thousand born alive); (iii) they often show high levels of human development; (iv) almost all the households (95 per cent) have radio and/or TV; (v) literacy among women in reproductive age is almost universal (96 per cent) and they have on average 8.6 years of schooling; (vi) their rates of female participation in economic activities of around 40 per cent; (vii) half of the women aged between 20 and 24 years remain single; (viii) almost half (47 per cent) of their population is enrolled in the national social security system; (ix) less than one fifth of households (17 per cent) receives federal transfers; and (x) a vast proportion of the labor force (75 per cent) has higher incomes than one minimal wage.

1036 municipalities, that concentrate around 38 per cent of the population of Mexico, have a TFR between 2.21 and less than 3.0 children. Those territorial units that form this group: (i) have diverse characteristics and conditions according to their size and degree of urbanization; (ii) infant mortality shows an average of 27 deaths for each thousand births; (iii) levels of human development are predominantly of medium-high degree; (iv) they show a high proportion of households (90 per cent) with radio and /or TV; (v) the female literacy rate is of 92 per cent, and schooling levels are of almost 7 years; (vi) they exhibit female participation in economic activities rates lightly lower than the national average (30 per cent); (vii) around 44 per cent of women between 20 and 24 years of age are single; (viii) more than one out of four individuals (27 per cent) have social security; (ix) one out of three households receives federal transfers; and (x) six out of ten employed workers earn more than one minimal wage.

1183 municipalities concentrate almost 19 per cent of all Mexicans and exhibit an equal or superior TFR to 3 children per woman²⁰ The political-administrative units that conform this group present the following features: (i) they are mainly small and rural; (ii) they register an infant mortality rate that is high above the national average (34.9 deaths for each thousand born alive); (iii) the predominant indexes of human development are of low and medium low degree; (iv) three of each four households have radio

and/or TV (74.9); (v) the literacy rate among the women of 15 to 44 years of age is of 80 per cent, and the average years of schooling are 5.2; (vi) only one of each four women is economically active; (vii) around 38 per cent of the women between 20 and 24 years of age remains single; (viii) the access to social security is very limited (11 per cent); (ix) more than half of the households (55 per cent) receive federal transfers; and (x) only one of each three employed persons receives a higher income than the minimum wage.

As it can be observed, the socioeconomic contexts of these three groups of municipalities show opportunity structures and levels of human development that are remarkably different among them. The two extremes exemplify the existence of two different worlds: the urban, modern and mestizo Mexico, on the one hand, and the rural, poor and predominantly indigenous Mexico on the other. The future demographic evolution of the country will depend to a large extent of the intensity and efficacy of the efforts directed to build bridges between both extremes and to narrow the existing gaps in regards to human development. It must be borne in mind, though, that half of all Mexicans live in the first group of municipalities, whereas only one of out of five lives in the second group.

The data presented show that the Mexican population is moving rapidly in a demographic transition process. Even in the municipalities which lag behind (with a TFR of 3 or more children) fertility is declining quickly: the TFR decreased by of 22 per cent between 1990 and 2000 (from 4.8 to 3.6 children per women), which implies a fall of around 0.11 children in average per year. The speed of this decline has been very significant in the rest of the country: around 30 per cent in the municipalities with lower fertility; (from 2.9 to 2.0 children, which meant a decrease of 0.09 children per year); and 28 per cent in municipalities with intermediate fertility -from 3.7 to 2.6 children, which represents a decline of around 0.11 per year).

In the municipalities which lag behind in the fertility transition process, current social programs destined to strengthen human capital formation and to support and provide social protection to marginalized groups who live in extreme poverty (through direct transferences and the encouragement of productive activities), constitute investments that besides fighting the symptoms and causes of social backwardness, can contribute to accelerate demographic change. These efforts, if they are held during the following years, could contribute to eliminate many of the socio-economic obstacles that limit additional fertility decreases in the most backward municipalities, and produce an acceleration in the pace of the decline in the following years, similar to that registered by municipalities with medium levels.

Municipalities with intermediate fertility levels show favorable socioeconomic conditions to impel fertility decline (low mortality, a high literacy and schooling rates among women, high exposure to mass media, and an advanced urbanization process). Also, the processes of diffusion of life styles and movement of women to the performance of non-traditional roles are being quickly incorporated in many municipalities. A proof of this is the high percentage of single women from 20 to 24 years of age (44 per cent), as well as the fact that more than one fifth of all women remain without children between 25 and 29 years of age. It is expected that fertility in this municipalities will continue to decrease, although maybe at a slower pace than in the recent past. If this happens, the TFR of these municipalities could go from an average of 2.6 at present time to 2.2 in the next ten years.

In the municipalities with a TFR close or below the replacement level, socio-economic factors that favor low fertility levels have generalized, promoting an improvement of women's social condition and the emergency of a life course structure in which marriage and maternity do not constitute the only destiny for women

It must be pointed out that the diffusion of family planning through media campaigns and the activities of health system agents have contributed to spread and generalize the knowledge of contraceptive methods among all the Mexican regions and groups. It is estimated also that in urban areas

almost all women in reproductive age (98 per cent) know at least one contraceptive method, whereas in rural areas the proportion is of 90 per cent. There is evidence as well that institutional campaigns through the mass media has contributed not only to spread information about the characteristics and advantages of family planning, but also to form and reinforce attitudes that are favorable to this practice.

In this context, it is not surprising to find that whereas the unmet demand for fertility regulation methods at the national level is of almost 10 per cent of women in reproductive age, for various other groups, such as peasant women, the poorest ones, the least educated, the youngest and the indigenous ones, unmet demand fluctuates between 20 and 25 per cent.

MEXICO: TOWARDS A FERTILITY REPLACEMENT REGIME?

Mexico's population policy has the explicit goal of reaching, by the year 2005, the TFR replacement level²¹. It is estimated that currently, about 71.4 per cent of married women in reproductive age uses contraceptive methods. In order to reach a replacement level, the use of contraceptive methods has to increase to approximately 73.5 per cent, something that requires an annual average increase of almost 0.5 per cent, which is less than 0.7 per cent registered in Mexico during the 1997-2001 period ²². Hence, the required increase in the use of contraceptive methods is feasible. Mexico has a strong and consolidated family planning program that is determined to take care of the unmet demand for contraceptive methods.

The effect on fertility decline exerted by the increase in the use of contraceptive methods could be reinforced by the changes that are taking place in family formation and dissolution patterns. Thus, after many years of being left unchanged, it can be observed in Mexico a gradual delay of the age at marriage. To this, it must be added an increase in the proportion of consensual and rates of divorce and splitting ups.

In figure 8 three scenarios of the future evolution of the TFR, according to the year in which fertility replacement is reached are presented. Under a long-term perspective, the forecast assumes that replacement level will be reached in 2005 coincides more with past trends that the alternatives which move it to 2015 or 2025, which break abruptly the descending pattern.

In general, the procedures followed by Mexico's National Population Council and the Population Division of the United Nations (UNPOP) to project fertility in Mexico are similar. The main difference resides in the assumption about the moment when replacement level could be reached. UNPOP supposes, in its medium hypothesis, that it would take place in 2020-2025. If this were so, the use of contraceptives would rise to 75.1 per cent by that time²³, and this would imply an increase of only 0.3 per cent per year starting in 1997, which is a negligible slope compared with the trends of the last years.

What would be the changes in reproductive behavior once the fertility replacement level is reached? In figures 7 and 8 we present the parity distribution at the end of and during the reproductive period. At the time when the new population policy started (1973-1976), almost 60 per cent of women ended their reproductive life having six or more children. However, once the replacement level is reached, an even larger proportion would conclude their reproductive life with two or less children. Only one in each eight women would end with a large offspring (4 or more children). The delay of the first marriage, and therefore of the birth of the first-born, would favor that, on average, every woman spend more than a third of her reproductive age without children (35 per cent) and that she dedicate 40 per cent to the upbringing of two children, with an interval between them of 6.7 years.

Contrary to the hypothesis that holds constant replacement level, once it is reached, the experience of many developed countries shows that fertility decline continues even below the replacement level. Likewise, among the developing countries that began their fertility transition in the

sixties, eight out of a group of 39 have a TFR equal or inferior to the replacement level.²⁴ Due to this reason, in the projections for Mexico we incorporated that trajectory as feasible. Thus, according to the demographic forecasts for the country, the TFR could decline even to 1.68 children in 2030 (a rate that is similar to those registered recently in Western and Northern Europe) and remain at that level during the next 20.

This extreme situation would imply a scenario that is completely different to the one registered in 1973-1976 by Mexican women. In it, four of five women (82 per cent) would conclude their reproductive age with 2 children or less; families with one (30 per cent) and 2 children (40 per cent) would be common, and large families would be almost extinct (4 per cent). Women would spend 40 per cent of their reproductive age without children and they would devote only 12 years (35 per cent) to the upbringing period, with a birth space between children of 7.4 years on average (even though that spacing would not occur in the case of 42 per cent of women that would end their reproductive lives without children or with only one child).



Figure 1. Population, natural increase rate and growth rate, Mexico, 1930-2000





Source: Estimates by Mexico's National Population Council.



Figure 3. Quintum, all births interval, Mexico, 1955-1991



Figure 4. Female distribution by parity at age 50 by period, Mexico, 1973-1997



Figure 5. Number of years lived in each parity, between ages 15 to 50, per woman aged 15, Mexico, 1973-1997

Source: Estimates by Mexico's National Population Council.



Figure 6. Total fertily rate for 16 states, Mexico, 1950-2000



Figure 7. Total fertility rate by place of residence, schooling and labor force participation, 1974-1996

Place of residence



Labor force participation





Figure 8. Total fertility rate projected by year in which replacement fertility is attained, Mexico, 1960-2050



Figure 9. Total fertility rate by marginalization index for all municipalities, 2000



Figure 10. Total fertility rate by infant mortality rate for all municipalities, 2000

499



Figure 11. Total fertility rate by human development index for all municipalities, 2000

Human development index

Reduction by 5 per cent		Reduction by 10 per cent			
State	Year	State	Year		
In 1968 and 1969		In 1970 and 1971			
Baja California	1968	Baja California	1970		
Baja California Sur	1969	Baja California Sur	1971		
Coahuila	1969	Coahuila	1971		
Chihuahua	1969	Chihuahua	1971		
Distrito Federal	1969	Distrito Federal	1971		
Nuevo Leon	1969	Nuevo Leon	1971		
Quintana Roo	1969	Sonora	1971		
Sinaloa	1969	Tamaulipas	1971		
Sonora	1969				
Tamaulipas	1969	In 1972 and 1973			
		Campeche	1972		
In 1970 and 1971		Colima	1972		
Campeche	1970	Mexico	1972		
Colima	1970	Morelos	1972		
Mexico	1970	Quintana Roo	1972		
Morelos	1970	Sinaloa	1972		
Veracruz	1970	Nayarit	1973		
Yucatan	1970	Tabasco	1973		
Aguascalientes	1971	Veracruz	1973		
Durango	1971	Yucatan	1973		
Guanajuato	1971				
Hidalgo	1971	In 1974 and 1975			
Jalisco	1971	Aguascalientes	1974		
Nayarit	1971	Chiapas	1974		
Tabasco	1971	Durango	1974		
Tlaxcala	1971	Guanajuato	1974		
		Hidalgo	1974		
In 1972 and 1973		Jalisco	1974		
Chiapas	1972	Michoacan	1974		
Michoacan	1972	Queretaro	1974		
Queretaro	1972	Tlaxcala	1974		
Guerrero	1973	Guerrero	1975		
Oaxaca	1973	Oaxaca	1975		
Puebla	1973	Puebla	1975		
San Luis Potosi	1973	San Luis Potosi	1975		
Zacatecas	1973	Zacatecas	1975		

Table 1. Date in which the TFR at 1965 was reduced by $5~{\rm and}~10~{\rm per}$ cent by state , Mexico

		Last year when TFR ≤ 6		<i>Last year when</i> $TFR \leq 3$		Yearly	
State	TFR in 1965	Year	TFR	Year	TFR	average decrease	TFR in 2000
Mexico	7.22	1974	6.11	1993	3.04	0.16	2.40
1967-1970	6.44	1968	6.14	1985	3.10	0.18	2.02
Baja California	6.29	1967	6.10	1990	3.05	0.13	2.15
Distrito Federal	6.35	1968	6.04	1983	3.11	0.20	1.80
Nuevo Leon	6.41	1968	6.11	1985	3.07	0.18	2.06
Baja California Sur	6.57	1970	6.01	1987	3.09	0.17	2.10
Coahuila	6.67	1970	6.14	1992	3.02	0.14	2.39
Sonora	6.64	1970	6.10	1987	3.09	0.18	2.12
Tamaulipas	6.62	1970	6.07	1988	3.00	0.17	2.12
1971-1972	6.86	1972	6.06	1991	3.01	0.16	2.19
Chihuahua	6.72	1971	6.03	1991	3.04	0.15	2.20
Quintana Roo	6.79	1971	6.15	1994	3.01	0.14	2.41
State of Mexico	6.95	1972	6.16	1991	3.02	0.17	2.18
Sinaloa	6.83	1972	6.01	1989	3.06	0.17	2.12
1973-1974	7.13	1974	6.03	1992	3.07	0.16	2.29
Campeche	7.10	1973	6.22	1993	3.10	0.16	2.26
Colima	7.06	1973	6.15	1989	3.00	0.20	2.11
Morelos	6.95	1973	6.00	1989	3.02	0.19	2.10
Tabasco	7.25	1974	6.21	1995	3.05	0.15	2.55
Veracruz	7.14	1974	6.04	1992	3.05	0.17	2.29
Yucatan	7.16	1974	6.06	1993	3.04	0.16	2.21
1975-1976	7.58	1976	6.13	1995	3.10	0.16	2.59
Durango	7.48	1975	6.26	1996	3.06	0.15	2.65
Nayarit	7.36	1975	6.10	1994	3.05	0.16	2.43
Aguascalientes	7.50	1976	6.02	1996	3.02	0.15	2.61
Guanajuato	7.60	1976	6.16	1997	3.07	0.15	2.75
Hidalgo	7.64	1976	6.21	1996	3.01	0.16	2.60
Jalisco	7.61	1976	6.17	1995	3.01	0.17	2.51
Tlaxcala	7.61	1976	6.17	1993	3.20	0.17	2.31
1977-1979	8.00	1978	6.16	1998	3.10	0.15	2.89
Queretaro	7.83	1977	6.20	1995	3.04	0.18	2.54
Chiapas	7.85	1978	6.01	1999	3.04	0.14	2.94
Guerrero	8.08	1978	6.25	2000	3.03	0.15	3.03
Michoacan	7.91	1978	6.05	1997	3.12	0.15	2.80
Puebla	8.03	1978	6.20	1999	3.09	0.15	2.98
San Luis Potosi	7.96	1978	6.10	1999	3.04	0.15	2.94
Oaxaca	8.11	1979	6.07	1999	3.02	0.15	2.92
Zacatecas	8.11	1979	6.02	1996	3.10	0.17	2.68

Table 2. Date in which the TFR reached the threshold of 6 and 3 children per woman in each state, M exico



Map 1. Period in which the TFR reached the threshold of 6 children per woman in each State, Mexico

Source: Estimates by Mexico's National Population Council.



Map 2. Total fertility rate by municipality, Mexico, 2000

Source: Estimates by Mexico's National Population Council.

NOTES

¹ It must be said that the proportion of women that have one child before the first five years of a stable union has constantly maintained its level in the last decades (around 95 per cent of all women have their first children in the first five years of union).

² To elaborate this analysis we used the proportion of women that give birth within the first five years of the first marriage or birth of a child, spanning the full period of fertility transition.

³ The interval between marriage and the birth of the first children has remained practically constant since the fifties among the different marriage cohorts (around 13 months).

⁴ This scheme has the property that if the product of each proportion is multiplied by the corresponding parity, the TFR for the period is obtained.

⁵ To analyze the long-term impact of the rise in well being of the female population, a logistic model with some socioeconomic determinants for the use of contraceptives was built (with exploratory objectives only). Based in the results and the use of current projections urbanization, household services, education and participation in the labor force for 2030, the use of contraceptive methods could vary from 75.6 to 78.3 per cent, which, according to the Bongaarts' model, would translate to a TFR from 1.62 to 1.86 average children per women for that year.

⁶ A more detailed analysis of the behavior of women of diverse generations indicates that marriage has been delayed about one year: the medium age at first union for women born between 1953-1962 was of 20.2 years: for the 1963-1967 birth cohort this figure rose to 20.8 years: and for the 1968-1972 generation it reached 21.3 years.

⁷ The percentage of pregnant women who declared having at least one abortion went from 22.7 per cent in 1987 to 19.6 in 1992 and 19 per cent in 1997. Also, the total abortion rate, that is, the average number of abortions a woman would have at the end of her reproductive life, has declined from 1.2 in 1976 to 0.1 in 1997. The reduction in the incidence of abortion is associated to the rapid increase in the use of contraceptive methods during the same period.

⁸ The incidence of maternal breastfeeding increased from 83 per cent in 1972-1976 to 85 per cent between 1982-1987 and to 90 per cent from 1994-1997. Nevertheless, the average duration of breastfeeding was reduced from 12.4 to 9.8 months between the first and the last period.

⁹ The National Urban System today has 364 cities distributed in all the regions of the country, where around 65 million people live. The cities of the country have become cardinal axis of the economic activity, to the extend that they generate around 96 per cent of the aggregate value of manufacturing, commerce and services.

¹⁰ The growing integration of ever more important segments of the population to the market of goods and services has modified direct and opportunity costs associated with reproduction, while it has made them more visible by strengthening the economic calculations as a pattern of orientation in the practices and conducts of people in very diverse environments.

¹¹ *Excluding*, since it leaves outside its circuit an important number of people who are not favored by accumulation; and *divergent*, because differences between the poorest and the richest are growing deeper.

¹² One of the variants of classic theory of transition (Social Justice and Demographic Transition) formulated by Ratcliffe, maintains, for example, that demographic behavior in the different social groups reflects the degree to which economic, social and political institutions promote social justice.

¹³ Not withstanding the differences, a clear convergence in the fertility levels of different regions and groups of the country is recognized. In figure 7 it can be observed that the gap of 2.4 children between 1974 between women resident in urban and non-urban areas decreased by half by 1996. With variables like schooling and labor force participation in similar levels can be observed.

¹⁴ Faria, V.E, "Government Policy and Fertility Regulation: Unintended Consequences and Perverse Effects", Brazilian Journal of Population Studies, V.I. 1997/1998

¹⁵ To this respect, it can be said, for example, that the proportion of births attended by a doctor has increased considerably in the last decades, going from 55 in the 1974-1976 period to 66 per cent between 1985-1987 and to 82 per cent in the 1994-1997 period. Efforts to address extend health services have reduced the difference between rural and urban zones. While in the 1985-1987 period, 37.8 per cent of rural women attended their births with a physician, this proportion increased to 58.9 per cent for the 1994-1997 period. In urban areas, this percentages where 84 and 91 respectively.

¹⁶ The availability of goods such as radio and television was generalized in the country during the last three decades. In 1970, only 31 per cent of all households had a television and 76 a radio. In contrast, these figures rose to 86 and 85 per cent in 2000.

¹⁷ Thus, for example, the population insured by Mexican Social Security Institute (IMSS) increased from 9.8 million in 1970 to almost 47 million in the year 2000, an increase that represents from 19.3 to 46.7 per cent of the national population.

¹⁸ The Programa Nacional de Educacion, Salud y Alimentacion (PROGRESA) has extended its coverage from around 300 thousand families in 1997 to 3.2 million in 2001.

¹⁹ It is estimated that Mexican women, who had a life expectancy at birth of around 65 years in 1970-1974, dedicated around 4.2 years to school and 10 years in the labor force. Twenty years later, in1990-1994, women invested with a life expectancy of 75 years, around 7.4 years to education and almost 20 years in labor activities. It is foreseen that these tendencies will continue their course the following years, so that by 2005, with a life expectancy of 78.9 years, educational formation could account to 9.6 years and the corresponding participation in the labor force participation to 25.5 years.

²⁰ Of this total, a few municipalities, mostly rural, show fertility levels similar to those observed in the country during the seventies (5 children or more); also, 271 municipalities have fertility levels similar to the ones observed during the first five years of the eighties (between 4 and less than 5 children); and finally, 893 municipalities have fertility levels similar to those prevailing in the country during the end of the eighties and the beginning of the nineties (between 3 and less than 4 children.)

²¹ The goal was proposed in 1995, when the *National Population Programme 1995-2000* was presented. This goal has also being sustained by the National Population Programme 2001-2006.

 22 It is estimated that between 1996 and 2001 the TFR decline approximately 0.39 children, corresponding to an annual decrease of 0.08 children. Reaching replacement in 2005 will imply a slower annual decrease of the TFR (0.06 children).

²³ When applying Bongaarts model, in this case we assume that the age at marriage, the average efficiency of contraception, observed abortion and breastfeeding practices remain constant from 1997 to 2020-2025.

²⁴ John Bongaarts, "The End of the Fertility Transition in the Developing World". Document presented in the Expert Group Meeting on Completing the Fertility Transition, 11-14 March 2002.