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**IMPLICATIONS OF UNMET NEED OF FAMILY PLANNING FOR POLICY
AND DEMOGRAPHIC IMPACT: A COMPARATIVE ANALYSIS OF
LARGE COUNTRIES**

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IMPLICATIONS OF UNMET NEED OF FAMILY PLANNING FOR POLICY
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I. INTRODUCTION

The important question faced by family planning program managers and planners of "How many contraceptive users will there be in the near future?" has usually been answered without solid empirical basis. The methods used range from different ways of extrapolating past trends to an arbitrary specification of future fertility targets. The concept of unmet need, which can be estimated using data collected in the DHS surveys, provides a more precise answer to this question. This concept has been developed and refined in the last decade by several demographers (Westoff and Pebley, 1981; Nortman, 1982; Boulier, 1984; Westoff, 1988a and 1988b, Bongaarts, 1990).

However, its current formulation is of limited use for family planning policy analysis and planning, and it suffers from two major constraints. First, DHS-based estimates of unmet need are in the form of proportions or percentages of currently married or in unions women. Given the sample design of most DHS surveys, it is difficult to estimate absolute numbers of women with unmet need at the national level, and even more problematic for different subpopulations. Second, the DHS estimates are for the year of the survey only, while the need is for estimates in the future.

Family planning policy analysis and planning exercises require absolute numbers, as well as projections of future needs. At the DHS World Conference in August of 1991, we proposed a simple model that has these two characteristics (Wolowyna, Starbird and Olson, 1991); the model was illustrated with DHS data from Bolivia. Here we apply the model to several countries and illustrate several of its potential policy and planning applications:

First, we show how the model can be used for estimating the fertility impact of satisfying the unmet need in a population, and compare it with the level of contraceptive method prevalence needed to reach replacement fertility levels.

Second, the model is used to project the future number of new contraceptive users for different countries and different time horizons.

Third, the model is applied to regions in a country, and is used to illustrate how regional strategies for family

planning interventions and their implications can be assessed.

Fourth, the number of women with unmet need for family planning can be considered as the market for family planning services. The model, coupled with additional data from DHS surveys, allows the user to define a method mix more responsive to women's contraceptive wishes, and to segment the market into two groups: those who need better service delivery, and those who require mainly IEC activities.

II. DEFINITION OF THE CONCEPT OF UNMET NEED AND FORMULATION OF A SIMPLE PROJECTION MODEL BASED ON THE CONCEPT

We shall use here the definition of unmet need for family planning proposed by Westoff and Ochoa (1991). One starts with currently married women (or in permanent union), and selects those not using a contraceptive method (Figure 1). These women are subdivided into two groups: those currently not pregnant or not amenorrheic, and those currently pregnant or amenorrheic. In the first group we eliminate those who are infecund, and define women with unmet need as those who want no more children or who want to postpone the next pregnancy at least for two years. The same criteria are used to define women with unmet need in the second group. The sum of the proportions with unmet need for the two groups results in the total unmet need.

The rationale for including women who are currently pregnant or amenorrheic in the definition of unmet need is as follows: Women who became pregnant against their wishes likely would not have become pregnant if they were using a modern contraceptive. Thus they were in need of contraception. The same holds for women who became pregnant earlier than they had intended.

Westoff and Ochoa's formulation is not without critics. Bongaarts (1991), for example, argues that this definition overestimates unmet need. We believe that the Westoff and Ochoa definition is more appropriate for immediate program purposes. We refer the reader to Westoff and Ochoa (1991) for a more detailed exposition of the concept of unmet need and a discussion of both definitions.

The proportion of women with unmet need can be subdivided into those who want to limit the number of children, and those who want to space their births. This distinction has important programmatic implications, as some contraceptive methods are better suited for limiting, while others are more appropriate for spacing. If one could estimate the size of each group, where they live, and their basic demographic and socio-economic characteristics, one could better tailor method mix to the needs of the women (Figure 2).

Figure 1

Unmet Need (Westoff Methodology),
Egypt, 1988

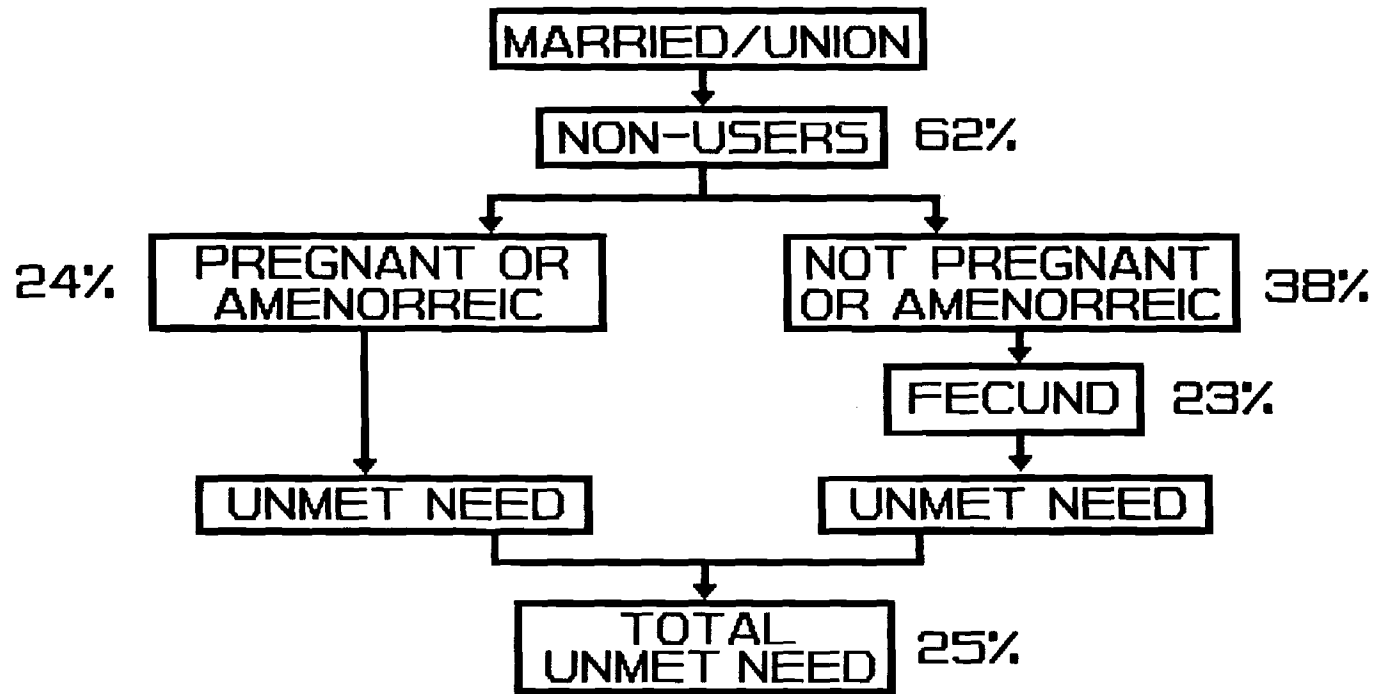
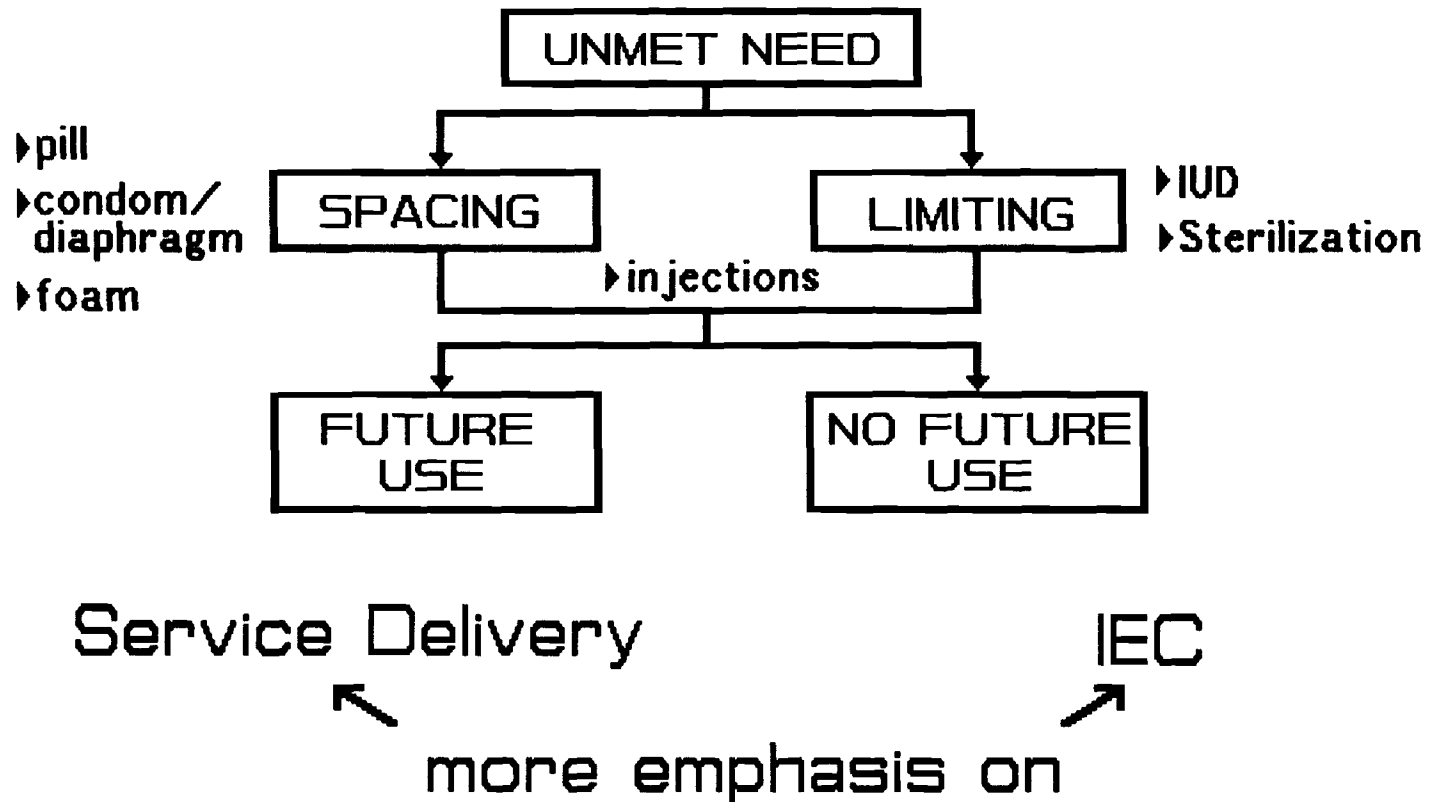


Figure 2

Unmet Need Programmatic Implications



Women with unmet need can also be subdivided into those who plan to use contraceptive methods in the future, and those who have no intentions of using contraceptive methods. As will be illustrated below, a high proportion of those who do not plan to use contraceptive methods in the future have no knowledge of these methods. A characterization of these two subgroups of women with unmet need could be useful for deciding where to emphasize service delivery activities vs. where to stress IEC activities.

We have already mentioned some of the limitations of the concept of unmet need as formulated by Westoff for family planning policy analysis and planning. A very simple model has been formulated to address these issues (Wolowyna, Starbird and Olson, 1991). We start with a yearly projection of women in childbearing ages (15-49 years), and multiply that by a constant proportion of married and in-union women. Future contraceptive method users can be conceptually divided into two categories, current users and those who will become users because they want to control their fertility, and women with unmet need who will become users thanks to efforts of the family planning program.

We assume that the size of the first group is obtained by applying the baseline (DHS survey) prevalence rate to projected married women (See Figure 3). With these assumptions future contraceptive users can be estimated by:

$$\text{Users}(t) = \text{FEM15_49}(t) * M * [C + U * d(t)]$$

where:

Users(t) = contraceptive method users in year t

FEM15_49(t) = females aged 15 - 49 in year t

M = proportion of currently married or in-union women among women aged 15-49

C = current contraceptive prevalence among married women

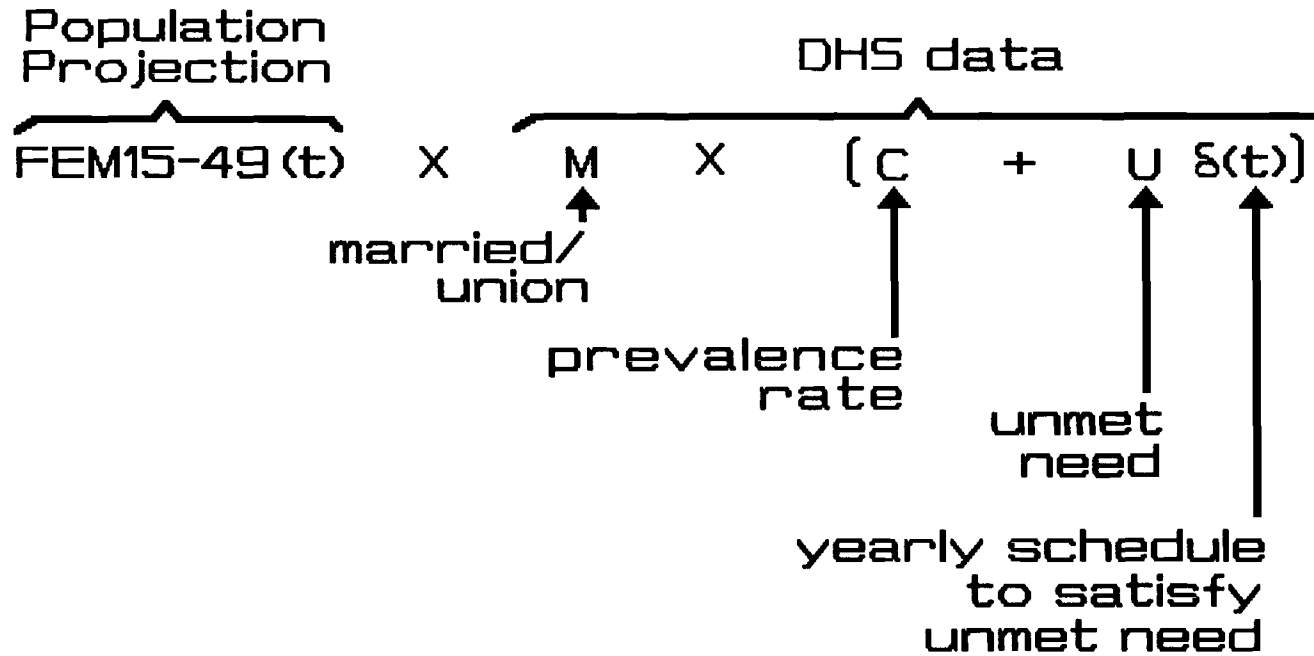
U = proportion of currently married women with unmet need

d(t) = yearly cumulative proportion of women with unmet need who will become users in that year

The model can be challenged on a number of implicit assumptions that may not be quite accurate. For example, in many societies the proportion married can change significantly with time, especially during certain stages of the demographic transition. There is evidence that the proportion of women with unmet need also varies with the stage of the fertility transition (Westoff and Ochoa, 1991). The classification of users into two categories: a) those who are obtained by adding women with unmet need according to an initial constant proportion, and b) those obtained by applying the initial prevalence rate to a projection of married women, can also be questioned on several accounts.

Figure 3

Estimated Number of Future Users



	88	89	90	91	92	93
Example: $\delta(t)$	0.00	0.05	0.25	0.69	0.94	0.99

Given these limitations, it is important to specify the operational constraints of the model. The model tries to address the question: "What would be the implications if currently measured unmet need were satisfied within a certain time frame?" The model should not be viewed as a precise planning tool, and the numbers should be interpreted more in terms of order of magnitude than in terms of precise values. Assumptions of constancy of certain key parameters imply that applications should be made for relatively short time periods. Also it would be very misleading to apply the model, as currently formulated, to countries with family planning programs in very early stages, like Nigeria, for example. For such countries it would be necessary to specify unmet need as a function of prevalence level, and perhaps of other variables as well.

The second objective of the model is to bring out the usefulness of the concept of unmet need for defining a market for family planning programs. Women with unmet need are the logical target for different family planning activities. A projection model provides the absolute numbers needed for general planning purposes. The segmentation of this market into women with a need for limiting and for spacing on the one hand, and those who know and do not know about modern family planning methods on the other hand, provides guidance for more accurately planning of levels of efforts for service delivery and for IEC activities. DHS data then allow one to define more precisely the magnitude, location, and characteristics of these segments of the market.

III. DESCRIPTION OF COUNTRIES

Seven countries were chosen to illustrate several applications of the model: Nigeria, Kenya, Egypt, Indonesia, Mexico, Brazil and Bolivia. The following criteria were used to choose these countries: a) the countries are defined by the A.I.D. Office of Population as priority countries (with the exception of Bolivia); b) they all have recent DHS surveys; and c) estimates of unmet need are available at the national and regional levels. All data are from the respective DHS surveys.

Table 1 presents key family planning indicators for the six priority countries. Four out of the six countries have very advanced family planning programs, with prevalence levels of about 40% or higher, and most of the prevalence is modern methods. Kenya is in the "growth" stage with a prevalence of 26%, two-thirds being modern method users, while Nigeria has a prevalence of only 6%.

Percent unmet need varies from a low of 13% for Brazil to a high of 38% for Kenya. The relationship between unmet need and prevalence seems to be curvilinear; it increases with level of prevalence and after reaching a maximum starts to decrease as prevalence continues increasing. This relationship is probably

Table 1. Key Family Planning Indicators for Selected Countries

Country	DHS Year	% Unmet Need (Married Women)	Prevalence for Married Women			Category*	% Distribution of Modern Methods						
			All Methods	Modern Methods			Pill	IUD	Inject.	Sterilization		Vaginal/ Condom	Norplant
				% Prev.	% of All Methods					Female	Male		
Nigeria	1990	20.8	6.0	3.5	58.0	Emergent	38.7	25.7	22.6	0.0	0.0	13.0	0.0
Kenya	1989	38.0	26.9	17.9	67.0	Growth	29.1	20.7	18.7	26.5	0.0	5.0	0.0
Egypt	1988	25.2	37.8	35.4	94.0	Consolidation	43.2	44.3	0.3	4.3	0.0	7.9	0.0
Indonesia	1987	16.0	47.8	44.0	92.0	Consolidation	36.6	30.0	21.3	7.0	0.4	3.7	0.9
Mexico	1987	24.1	52.7	44.8	85.0	Consolidation	21.3	22.7	6.2	42.4	1.8	5.5	0.0
Brazil	1986	12.8	66.2	57.0	86.0	Mature	44.6	1.4	1.1	47.7	1.4	3.8	0.0

* AID classification of family planning programs based on percentage prevalence of modern methods

0-7 Emergent

8-15 Launch

16-34 Growth

35-49 Consolidation

50 + Mature

Source: DHS reports

influenced by other factors. Method mix, for example, is likely to have an effect on both unmet need and prevalence.

In the case of the countries chosen, there is a great variety in the distribution of modern methods among contraceptive users. At one extreme we have Mexico, with 42% sterilization. Adding the pill and IUD, these three methods account for 86% of all the modern method users. Almost half of the modern method users in Brazil rely on sterilization and adding pill users accounts for 92% of all the modern method users. In Kenya, most users are distributed fairly uniformly among pill, IUD, injection and female sterilization. In the other three countries, pill, IUD and injections account for about 90% of the modern method users. This variety of method mix needs to be taken into account in any further investigation of unmet need, as it is likely to have important implications for a better targeting of segments of the market identified by the model.

IV. FERTILITY IMPACT

One important policy question is: "What would be the fertility impact if the unmet need for family planning were satisfied?" A related question would be: "How does the prevalence achieved by meeting unmet need compare with the prevalence required to reach replacement fertility (approximately TFR = 2.1)?" The proposed unmet need model can help us to answer these questions. First, it is important to note that given the assumptions of the model in its current formulation, the prevalence level, once unmet need is satisfied, would be just the sum of the base year prevalence and the unmet need measured at that time. (For example, for Egypt the prevalence level once unmet need is satisfied would be 63.0% [37.8% + 25.2%.]) It is clear that during actual implementation of a family planning program that strives to satisfy the unmet need, both of these parameters would change with time. The objective here, however, is to answer the hypothetical policy question posed above.

In Table 2 we present results that answer both questions (Nigeria was excluded from this analysis for reasons explained above). In the case of Kenya, satisfying unmet need would increase prevalence from 27% to 65% and TFR would be reduced from 6.7 to 3.7. (These estimations were made with the TARGET model, assuming the original method mix constant). In order to reach a TFR of 2.1, prevalence would have to reach 85% of married women, assuming that the original method mix has not changed. Egypt would see a prevalence increase from 38% to 63% and the TFR would drop from 4.4 to 2.7. A prevalence of 72% would be consistent with a TFR of 2.1. Satisfying unmet need for Indonesia would bring the prevalence level up from 48% to 64%, and the fertility level would decline from 3.3 to 2.3. Thus only a small increase in the prevalence rate, to 67.4%, would yield a TFR of 2.1. Given the already high level of prevalence in Mexico, 53%, and

Table 2. Fertility Impact of Satisfying Unmet Need and Prevalence Levels Needed to Reach Fertility Replacement Levels, for Selected Countries

Country	Base Year	% Prevalence (Married Women)	TFR
Kenya	1989	26.9	6.7
		64.9*	3.7
		85.0**	2.1
Egypt	1988	37.8	4.4
		63.0*	2.7
		71.9**	2.1
Indonesia	1987	47.8	3.3
		63.8*	2.3
		67.4**	2.1
Mexico	1987	52.7	3.8
		76.8*	1.9
		75.0**	2.1
Brazil	1986	66.2	3.5
		79.0**	2.3
		81.0**	2.1

* Prevalence obtained if the base year unmet need is satisfied

** Prevalence needed to achieve TFR= 2.1

probably also due to the fact that more than 40% of modern method users were sterilized, the prevalence level of 77% after unmet need is satisfied yields a TFR of 1.9 (below replacement level). Finally, satisfying unmet need in Brazil would increase the prevalence from 66% to 89%, and reduce the TFR from 3.5 to 2.3.

This analysis shows that, in principle, satisfying unmet need for family planning in these countries would have a significant effect on fertility. The expected reductions in TFR vary between 30% and 45%. Just satisfying unmet need would also bring these countries a long way towards the goal of achieving TFR levels of 2.1. In the case of countries with "emergent" family planning programs like Kenya, significant declines in fertility (from 3.7 to 2.1) would still have to occur to reach replacement levels. But in countries with family planning programs in the "consolidation" or "mature" stage (like Egypt, Indonesia, Mexico and Brazil), meeting unmet need would result in TFRs at or close to replacement levels.

V. PROJECTION OF FUTURE USERS

The proposed model gives us a feel for the level of effort needed (in terms of numbers of users) to satisfy the unmet need. A key parameter here is the number of years needed to satisfy this need. An examination of the yearly number of additional users in both categories--those needed to maintain the original prevalence rate and those needed to gradually reduce the proportion of women with unmet need--can shed some light on this important question. The yearly schedules of additional contraceptive users needed to satisfy the unmet need are modeled using logistic curves with alternative time horizons of 5 and 10 years for converging to 1.0.

Taking the country with the most advanced family planning program, Brazil, it can be seen from Figure 4 that it would be unrealistic to set a goal of satisfying unmet need for family planning in five years. In the second year of the program the additional unmet-need users surpass the number of users needed to maintain the original prevalence level by almost 70%. The following year there would be almost three times as many users in the first group as in the second group, and the next year the ratio is almost 2.5. It would be very difficult for any family planning program to absorb such a rapid increase of users. As illustrated in Figure 5, a 10-year target looks much more reasonable.

For a country with a less advanced family planning program such as Egypt, even a 10-year target to satisfy unmet need seems extremely ambitious (see Figure 6). A few years into such a program, the number of additional users needed to satisfy this objective is 4-5 times the number of users needed to maintain the original level of prevalence.

Figure 4. Brazil: Yearly Additional Users
a) Constant Initial Prevalence;
b) Fullfillment of Unmet Need in 5 Years

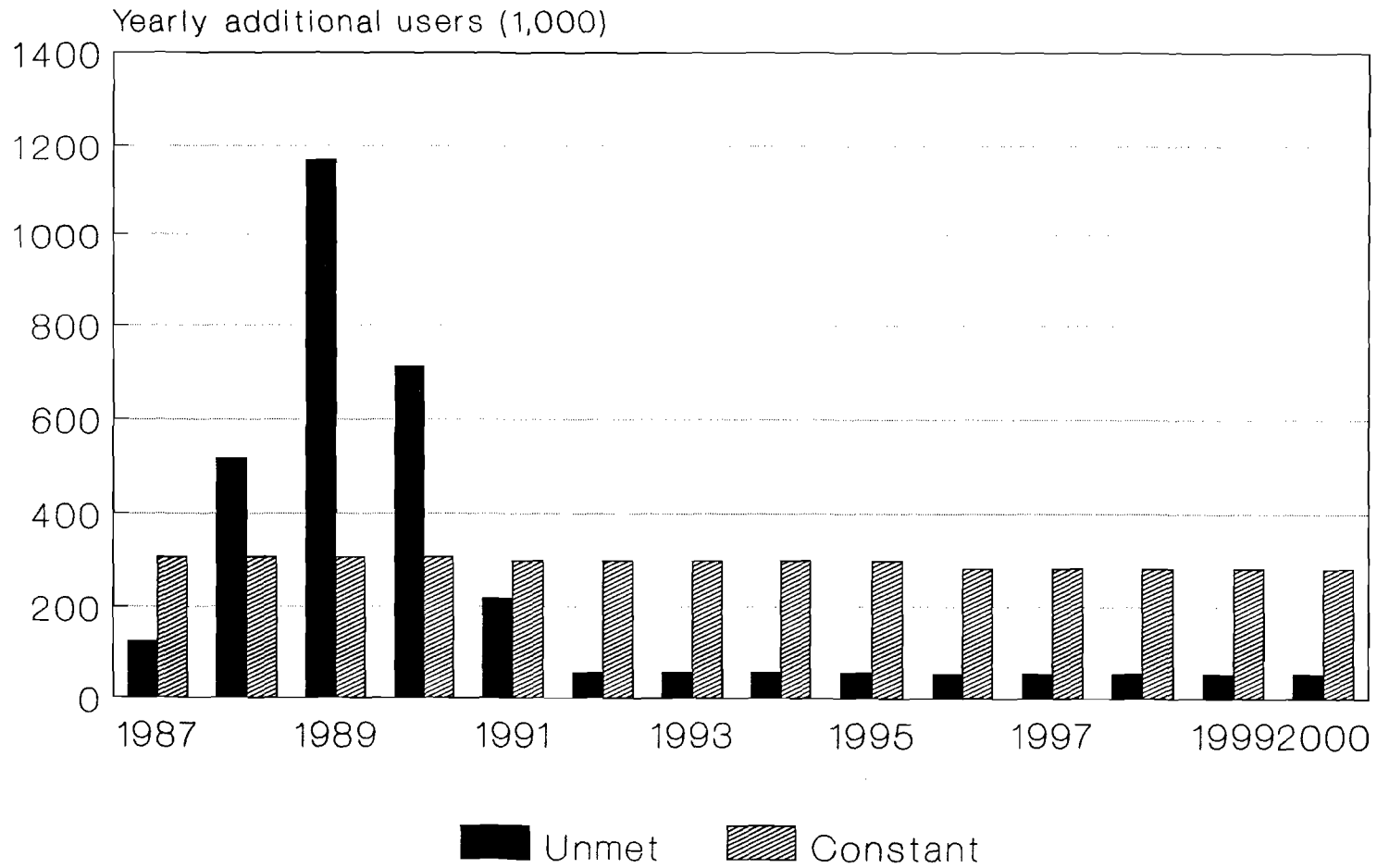


Figure 5. Brazil:Yearly Additional Users
a) Constant Initial Prevalence;
b) Fullfillment of Unmet Need in 10 Years

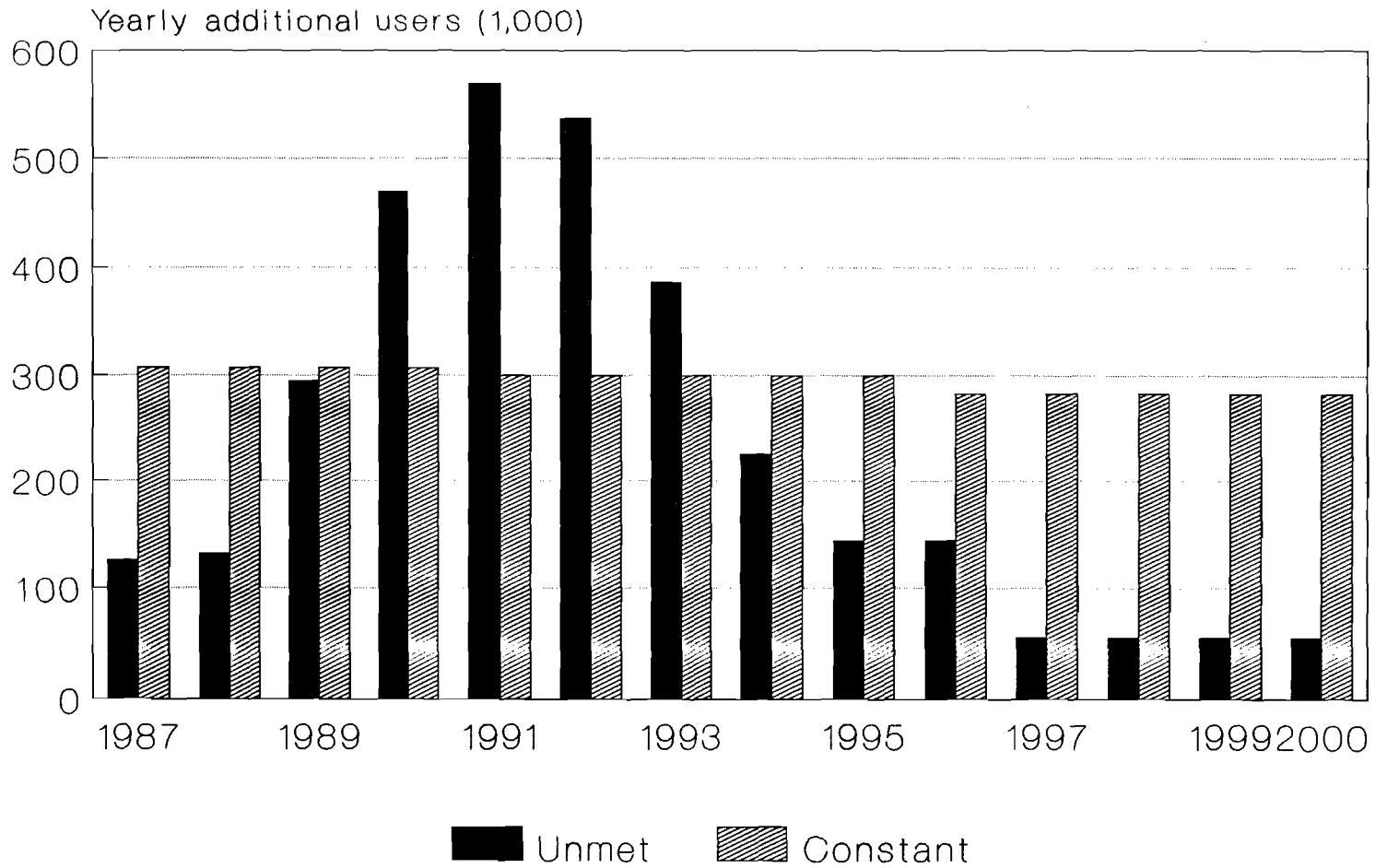
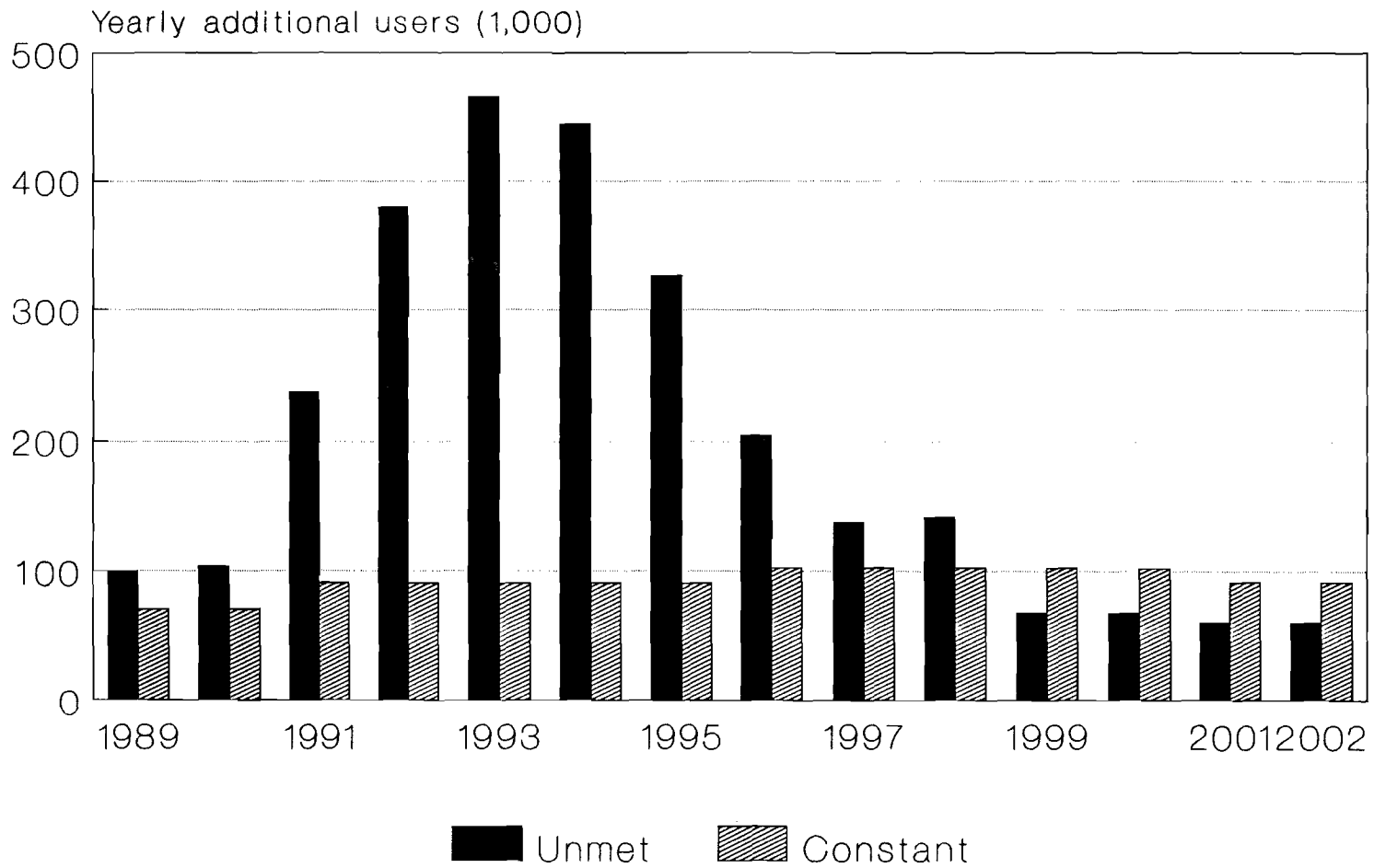


Figure 6. Egypt: Yearly Additional Users
a) Constant Initial Prevalence;
b) Fullfillment of Unmet Need in 10 Years



VI. REGIONAL STRATEGIES

Within each country there is significant variation in terms of fertility level, prevalence rates and unmet need for family planning. The proposed model allows one to simulate different regional family planning strategies, estimate their fertility effects, and have a better idea of their implications for family planning program needs. We shall illustrate this application by estimating some of the possible implications of the A.I.D. strategy of working primarily in the Northeast region of Brazil.

Although the family planning program in Brazil is in the "mature" stage, the family planning needs of the Northeast region are still high compared with other regions. The total fertility level there is 5.6, and 24% of married or in-union women have an unmet need for family planning (Table 3). An aggressive family planning program, with the objective of satisfying unmet need in the region in 7 years, would be able to increase prevalence from 53% to 73%, and reduce TFR from 5.6 to 2.7 (Table 4).

What would be the impact of this strategy on the overall fertility situation in Brazil? Two simulations were made to address this question. In the first (Strategy I), we assume that all regions except the Northeast will be able to satisfy unmet need in seven years, while the Northeast region will need 15 years to reach the same point. This scenario attempts to simulate the situation where no special effort is made in the Northeast region and assumes it will take about twice as long for the region to catch up with the other regions of the country. In the second scenario we assume unmet need in all regions, including the Northeast region, will be satisfied in seven years. Strategy II tries to simulate the possible fertility impacts, for the whole country, of a very successful family planning program in the Northeast region.

After seven years under Strategy I, the prevalence rate for the whole country will increase from 66.5% in 1986 to 76.6% in 1993, and the TFR will be 2.5 in 1993 (Table 5). With the second strategy, i. e., a concerted effort in the Northeast region to satisfy the unmet need in seven years, the prevalence rate in 1993 will be 78.8%, and the country's TFR will be 2.4. Thus, at the national level the fertility impact does not seem to be very large. However, the true impact of a strong family planning program in a region should be evaluated at the regional level. As was seen in Table 4, a reduction in TFR from 5.2 to 2.7 in seven years would be remarkable. It should be noted that the more ambitious program (Strategy II) requires a total of 501,000 more contraceptive users than Strategy I to achieve approximately the same TFR.

It is also important to remember that increasing prevalence may not be the only goal of a family planning program. In countries

Table 3. Key Regional Indicators of Family Planning for Brazil, 1986

Region	% Women 15–44 in the Region	TFR	Prevalence for Married Women			Category	Unmet Need
			All Methods	Modern Methods			
			% Prev	% Of All Methods			
Rio	10.5	2.6	71.1	62.8	88.3	Mature	8.8
Sao Paulo	22.0	2.9	73.9	63.9	86.5	Mature	6.5
South	19.4	2.8	74.4	63.6	85.5	Mature	7.1
C.East	15.5	3.1	64.5	55.3	85.7	Mature	11.8
N.East	27.0	5.2	53.2	43.4	81.6	Consolid.	24.2
N/C West	5.6	3.6	63.0	57.7	91.6	Mature	14.3
Total Country	100.0	3.5	66.2	57.0	86.1	Mature	12.8

Source: DHS Reports

Table 4. Effects of Satisfying Unmet Need in the NE Region of Brazil in Seven Years

Indicator	1986*	1993
% Unmet Need	24.2	--
% Prevalence (Married)	53.0	73.2
TFR	5.2	2.7

Source: * DHS Report

Table 5. Brazil: Fertility Impact of Satisfying Unmet Need According to Two Regional Strategies Based on the NE Region

Indicators	1986***	Strategy I*	Strategy II**
TFR	3.5	2.5	2.4
% Prevalence (married)	66.5	76.6	78.8
Cumulative number of users/unmet need in the NE Region at 1993		930,000	1,431,000
		Diference: 501,000	

* All regions of Brazil, except NE, satisfy unmet need in seven years, and NE will take 15 years.

** All regions, including NE, satisfy unmet need in seven years.

Note: Women Aged 15 – 44, in the NE Region represent 27 % of all Women Aged 15–44, in Brazil.

Source: *** DHS Report

that already have low total fertility and high contraceptive prevalence, improving method mix (meeting "mis-met" need) and targeting underserved groups may also be important goals. As will be seen below, the model proposed here provides planners with information for assessing these needs.

VII. USING THE MODEL TO MEASURE THE MARKET

Once the total number of women with an unmet need for family planning is estimated, it is possible to refine this estimate along several dimensions. For women not using contraceptive methods, the DHS survey asked if they had future plans for using contraceptive methods. This additional information can be very useful for segmenting the market for different types of family planning program activities.

We shall illustrate this application with data from Bolivia, as this type of information was not available for the other countries. In the case of Bolivia, there was a very close relationship between expressed desire among women with unmet need to use family planning in the future, and their knowledge of modern contraceptives. For the whole country, 51% of women with unmet need said they had no intention of using contraceptive methods in the future, and 42% had no knowledge of any modern contraceptive. There was a very large overlap between the two groups (Table 6). Thus one can infer that, at least in the case of Bolivia, the main reason why women with unmet need have no plans to use contraceptive methods in the future is that they have no knowledge of them. The programmatic implication of this finding is that the majority of women with unmet need who had no plans to use family planning in the future constitute a market for IEC activities. Those who had future plans for FP use, on the other hand, would require more service delivery activities.

In most countries there is significant geographical variation in terms of the key family planning parameters. A geographical segmentation of the market is also necessary for organizational and logistic reasons. We have divided Bolivia into six fairly homogeneous geographical regions, subdivided into urban (or major city) and rural (or rest of the region) areas (Table 6).

First, we observe a fairly strong correlation between no future plans for family planning use and no knowledge of modern contraceptives. Also having a projection of women in childbearing ages for these areas, one can estimate the size of the market "no future use of family planning". Thus for example in the case of City La Paz or Rest of Cochabamba, women with unmet need are split about 50/50 among those who plan and those who do not plan use family planning in the future. In the case of City of Santa Cruz, on the other hand, only about one fourth do not plan to use family planning in the future. These proportions can be used for better allocation of resources among service

Table 6. Number of Married Women With Unmet Need, Percentage With No Future Plans of Family Planning Use, and Percentage With No Knowledge of Any Modern Contraceptive, by Region: Bolivia, 1989

Region	Total	No Future Use		% Do Not Know Any Modern Method
		N	%	
City of La Paz	66,600	33,500	50	42
Rest of La Paz	65,600	40,500	62	60
City of Cochabamba	16,700	6,600	40	14
Rest of Cochabamba	33,600	18,600	55	45
City of Santa Cruz	22,200	6,000	27	9
Rest of Santa Cruz	30,500	8,000	26	14
Oruro–Potosi Urban	25,300	12,000	47	35
Oruro–Potosi Rural	37,800	24,800	66	71
Beni–Pando Urban	4,900	1,800	37	6
Beni–Pando Rural	6,200	2,500	40	19
Chuquisaca–Tarija Urban	9,700	4,300	44	26
Chuquisaca–Tarija Rural	27,700	19,500	70	60
Bolivia	346,800	178,100	51	42

Source: DHS Data

delivery and IEC activities. The absolute numbers can be used to estimate the resources needed to provide services to so many potential users.

One can further specify the market by looking at socio-economic and demographic characteristics of women in the different market segments. For example, women who do not plan to use family planning in the future are older than women who do have plans. The level of education of the first group is significantly lower than that of the second one. Number of ever born children, on the other hand, is not a good discriminator among the two groups. This type of information can be very useful in the design of appropriate educational material for these market segments.

VII. SUMMARY AND CONCLUSIONS

In summary, the model proposed here attempts to apply the concept of unmet need to family planning policy analysis and program planning. By combining proportions of women in various unmet need categories from the DHS with projections of actual numbers of women in these categories, the model provides policy makers and program managers with information to begin to answer a number of questions:

What is the effect on total fertility of meeting unmet need and how much additional gain in prevalence is required to reach replacement fertility?

What is a realistic time horizon for meeting unmet need? Can unmet need across regions be met within the same time horizon? What are the implications for different time horizons for the total number of users?

What is the appropriate balance between services and IEC given the characteristics of women with unmet need? How does the actual method mix compare to the method mix suggested by women's childbearing preferences?

The answers to these questions can help policy makers and planners set realistic goals, allocate resources, and develop quality family planning programs that are better targeted to the needs of current and future users.

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