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Cost Implications of Population  
Stabilization

By

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## Introduction

The cost of supporting population and family planning programs adequate to reduce the current high levels of fertility to levels that are socially and economically desirable is extremely difficult to estimate. As illustrated by the following discussion, lack of reliable data and the inability to predict the consequences of various levels and mixes of expenditures on demographic behavior introduces an unusually large degree of uncertainty relating to the fiscal needs necessary to deal with this vital issue of human affairs. Recognizing the current difficulties in estimating both outputs and costs this paper will attempt to project the resources required to achieve a level of contraceptive prevalence that may be viewed as "stabilizing" to population growth. An estimate of "donor support" will then be made. These calculations, although illustrative, can be regarded as a basis for future refinement.

## Difficulties in Assessing Program Costs

There are many factors contributing to the difficulty of assessing or predicting program costs. These are related to the nature of family planning outputs, difficulties in collecting and interpreting input data, differences in socio-economic settings, and variability in delivery systems.

Program Outputs: Possible measures vary from number of acceptors, estimates of couple years of protection (CYP) and births averted, to crude or other fertility rates. Due to availability of information and

the relative ease of interpretation, prevalence rates will be used in the analyses presented here. The prevalence rate used is the proportion of couples in union of reproductive age, usually age 15-49, who are using contraception at any point in time. It should be noted that the impact of prevalence rates on fertility will vary depending on the effectiveness of the contraceptive mix, the pattern of continuation and drop-out rates, the age-sex structure of the population and the level of abortion practice.

Cost Data: Data relating to costs are difficult to find and interpret. For example, data from national programs or special studies reveal that costs range from less than \$5 to over \$50, or sometimes even over \$100, per user per year. An illustration of one of the factors affecting this variability is that in many countries costs of national programs may be all that is available, but in countries such as Brazil, a very large share of family planning may be through the private sector. Existence of private sector expenditures, if not accounted for, leads to an underestimate of family planning program costs, since prevalence figures usually do not differentiate the source of services.

Nortman and Hofstatter (1980) have pointed out the many difficulties relating to measurement of program inputs. It is not our intention to repeat her extensive analysis or conclusions; some examples will suffice. Difficulties include; estimating family planning service costs of integrated programs and shared facilities, the fact that obligation or allotments may not correspond to expenditure, and frequent unavailability of local expenditures in national programs. In addition, foreign aid or donated commodities may either be excluded from cost estimates altogether or diverted to other programs, e.g., broader health

or MCH programs. Overall costs may include activities such as construction of facilities, research, health programs, or demographic measurement which are not directly related to provision of family planning services. When methods with little recurring cost, i.e., sterilization and to a lesser extent IUD use, constitute a significant share of program use (as they do in India), then the prevalence of use carried over from previous year expenditures may result in an artificially low cost per user figure.

Program Maturity: Typically, programs have very high cost per user in the early years. These start-up costs may give the impression of a very inefficient program. Costs per user typically decline over time as prevalence rates go up. It is usually not known whether costs will again rise as prevalence costs reach over 50%, 60%, or 70%. Costs presumably would be higher when programs must deal with the "hard-to-reach."

Socio-Economic Setting: Another strong determinant of program costs is the social and economic setting in which the program is carried out. Relatively advanced developing countries with considerable administrative capacity, and particularly, it is argued, those with an existing infrastructure to which family planning can be added (e.g., health infrastructure), may have lower family planning costs per user than programs which require large preparatory investments to build infrastructure, train staff, and which possess relatively meager administrative capability and efficiency. Higher socio-economic setting countries found in much of Latin America or East Asia typically have much more efficient programs than in those countries of very low socio-economic status, for example, some South Asian countries and most

Sub-Saharan African countries. Nortman has pointed out the difficulty of measuring the qualitative support of a family planning program, i.e., the political commitment and leadership devoted to ensuring program success.

Nature of the Delivery System: Another factor which impacts on costs relates to the type of delivery system. Delivery systems which are integrated with health programs, such as primary health care or maternal and child health care programs, and which require support for these services as well, may have total costs several times higher than programs wherein family planning costs relate only to an add-on service joined to an existing delivery system infrastructure. Also important to cost implications is the mix of contraceptive services delivered, whether they are delivered by out-patient clinics or camps, or require in-patient hospitalization (which is usually much more expensive); or whether they require continuous operation of an infrastructure for resupply of commodities. For example, bulk-purchased oral contraceptives provided by AID cost about \$2 per year for each user. Costs of protection associated with IUDs and especially with sterilization are relatively low. An additional factor will be whether recipients of family planning services are required to pay for some of their service costs, as in the case of the subsidized contraceptive retail sales programs, or whether these are provided entirely free.

#### Estimates of Program Costs for Population Stabilization

It is difficult to estimate the magnitude of contraceptive prevalence increase which will result from any increase in family planning program funding. Countries which have favorable settings, both in terms of policy and socio-economic status, are likely to experience

rapid increases in contraceptive prevalence when population program funding increases. However, in other countries with less favorable settings, considerably more time and resources will be necessary to develop the favorable policy, infrastructure, and social setting needed to bring about needed increases in contraceptive prevalence.

In calculating need for donor support, one must consider the size and the location of the target population. In the present calculations, we will exclude the People's Republic of China because this program has used very little outside donor support, and its operational cost is unknown. Chinese representatives to the Jakarta Conference on Family Planning in the 1980s pointed out that the highly integrated service delivery programs in their country make cost estimation very difficult.

In Table 1, we provide a rough estimate of the global target population in the LDC's. There are about 2.3 billion people living in less developed countries (LDC's) outside the People's Republic of China. About 500 million of these are fecund women, age 15-49, and about 400 million of these are sexually active and exposed to pregnancy. The proportion needing contraception is reduced by about 10% because of sub-fecundity and infertility from natural causes. It is reduced by another 10% if one includes the time required to become pregnant, carry a pregnancy to term, and subsequent post-partum infertility due to lactation. This assumes about 2.2 births per woman as the figure needed for population stabilization. Thus, the number of women needing contraceptive coverage in LDC's outside of China is reduced to 300 million.

These estimates correlate quite well with regression equations plotting crude birth rate against percent of married women of

reproductive age using contraception. Such analysis suggests that somewhere around 80% of married women of reproductive age should use contraception for the crude birth rate to equal the crude death rate (which is currently about 12). This linear regression equation is calculated using empirical data from many programs which compare crude birth rates to percent Married Women of Reproductive Age (MWRA) who are contraceptive users (see Figure 1).

As can be seen from Table 2, only about one-fifth of women in union age 15-49 are currently using contraceptives in LDCs, whereas about four-fifths (80%) are needed for population stabilization. From this data, very crude international estimates of costs of programs can be made. It is currently estimated that LDC expenditures for population and family planning programs (exclusive of the People's Republic of China) are running about \$1 billion annually. Of these expenditures, \$450 million comes from donor sources (see Table 3), the remainder from LDC's themselves. For the 80 million current users, this implies about \$12 per year per user, a figure which correlates fairly well with data from mature national programs where reasonably good data are available. It should be noted, however, that there are a number of countries where relatively inefficient family planning programs have pushed costs per user per year into the \$30 to \$50 per year range. If one assumed the efficiency of current programs, to go from one-fifth to four-fifths of MWRA using contraception implies a need for four times the current investment, or about \$4 billion annually, and if the same ratio of donor to host country resources is kept, this would imply about \$1.8 billion annually from donor sources, not considering inflation. Indeed, if any of the above assumptions were relaxed, e.g., program efficiency

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improves, the private sector carries a larger share of the operation, or countries bear a larger proportion of program costs, these estimates will be reduced.

However, as can be seen from Table 4, some countries contribute disproportionately to world population growth. Areas of the world which have yet to initiate family planning programs are usually those very countries and regions where the cost per user will be considerably higher than for programs already underway. If one breaks out the cost implications by major countries and regions as is done in Table 5, it suggests that the cost implications might be considerably higher than those estimated above. Furthermore, in many countries it may be necessary to increase the proportion of donor support since most of these countries are of very low socio-economic status. These countries require greater infrastructure building efforts and are also the countries which are least able to help themselves.

When examining Table 5, one must keep in mind some of the estimation issues discussed earlier, especially since individual country circumstances may drastically alter cost overtime. For example, the low fertility in the Cameroon probably relates more to disease-caused sub-fecundity than use of contraceptives, so costs are artificially low. In India, previous year expenditures on sterilization are not counted, whereas sterilization acceptors from previous years go into the prevalence figures -- thereby lowering the cost calculations. In Brazil, most contraceptors are private sector users; therefore, program costs appear to be very low per user. In fact, real costs are not known. In many other countries, inputs go to support health programs and population activities which include a wide variety of activities,

e.g., demographic work, thereby giving extremely inflated costs per user. In this volume, Gillespie, Mamlouk, and Chen have reviewed the literature relating to the cost of family planning. They have shown that costs per new acceptor and per couple year of protection are often in the \$20-\$50 range. This suggests that national program costs per user are often much higher than the \$12 noted above, but private expenditures are not counted. The variability of the relationship between program expenditures per MWRA and prevalence rates is shown in Figure 2.

It is evident that there is clear risk in projecting future needs. The cost structure for the year 2000 will become decidedly different than that of the year 1980. As can be seen in Table 6, expected growth of the target population of almost 100% will have occurred between 1975 and the year 2000. Furthermore, if inflation persists at somewhere around 10% per year, it implies a decline in the value of the dollar to about one-eighth its current level by the year 2000. These two factors together suggest a 16-fold increase in the figures noted above, or a total of \$64 billion annually in the year 2000. These estimates are sensitive to the assumed inflation rate. On the other hand, the effects of economies of scale, the development of more cost-effective strategies, and the likelihood of substantial growth in private sector services may reduce these cost estimates. In any event, although the findings of the present paper should be updated based on new knowledge regarding underlying assumptions, they do provide both a methodology and a yardstick against which future estimates may be evaluated.

Table 1

Estimated Number of LDC Couples (Exclusive of China) Who Must Contracept for the Birth Rate to Equal the Death Rate (in millions)

(1) Population of LDCs (exclusive of China)	2310
(2) Number of LDC women 15-49	534
(3) Number of LDC women 15-49 in union (MWRA)	384
(4) Number of LDC women fecund	345
<hr/>	
(5) Number of LDC women needing fertility control assuming lifetime fertility of 2.2 with 1 year postpartum lactation	<u>306</u>
(6) Number of LDC women needing fertility control to reach CBR = CDR = 12 based on estimated 80% contraceptive prevalence among MWRA	<u>307</u>

(5) and (6) are estimates of numbers of couples who must contracept for the Net Reproductive Rate to equal 1.

MWRA = married women of reproductive age.

- (4) assumes 10% subfecund or sterile from natural causes.
- (5) assumes 34 year reproductive life span with (9/12 yr. + 1 yr.)2.2 = 3.85 years of infertility because of pregnancy and postpartum lactation, or 11% decrease in target population.
- (6) estimate of 80% prevalence needed for CBR = CDR is based on regression lines constructed from empirical family planning program data. (see Figure 1)

Table 2  
Estimates of Regional Contraceptive Prevalence

(1) Region	(2) No. of Women 15-49	(3) No. of Women 15-49 in Union	(4) No. of Women 15-49 in Union Using Contra- ceptives	(5) % Women
(000)	(000)	(000)		
LDC's (inc. China)	781,372	525,022	173,344	34
LDC's (exc. China)	533,637	383,813	32,322	21
Africa	81,809	60,799	2,365	3
Asia (inc. China)	567,919	382,360	152,676	40
Asia (exc. China)	320,184	241,151	56,854	24
Latin America	54,325	48,605	17,308	35
Near East/ North Africa	47,319	33,258	5,795	11

Source: Population Reference Bureau

TABLE 3

TABLE 500  
 PRIMARY\* SOURCES OF GRANT FUNDS FOR INTERNATIONAL POPULATION ASSISTANCE  
 (in \$ millions)<sup>‡</sup>

Sources/Funding Period <sup>‡</sup>	1965-76	1977	1978	1979	1980	1965-80
<u>Major Donors (excl U.S.)</u>						
Australia	2.0	.5	1.0	2.8 <sup>n</sup>		
Belgium	2.3	1.4	1.0	2.1	1.5	8.3
Canada	38.1	10.7	13.8	9.7	9.9	82.2
Denmark	20.9	6.6	8.1	8.5	8.1	52.2
Fed'l Rep'c of Germany	30.5	7.7	12.1	12.7		
Japan	31.0	12.2	16.3	19.1	25.9	104.5
Netherlands	33.4	8.8	12.1	14.8	15.0	84.1
Norway	68.1	26.3	29.2	31.1		
Sweden	131.0	32.0	27.9	28.3	29.0	248.2
United Kingdom	32.1	10.4	18.4	18.0		
OPEC Countries	8.8	1.3	1.2	.1		
All Other Countries	15.1	2.2	1.4	2.3		
ALL COUNTRIES (excl U.S.)	413.3	120.1	142.5	149.6	155.0 <sup>e</sup>	980.5
<u>Non-Governmental</u>						
Ford Foundation	178.0	8.6	7.8	6.4	5.4	206.2
Rockefeller Foundation	69.5	4.5	4.1	5.6	5.1	88.8
TOTAL NON-GOVERNMENTAL	247.5	13.1	11.9	12.0	10.5	295.0
TOTAL: NON-U.S. GOV'T	660.8	133.2	154.4	161.6	165.5	1,275.5
U.S. Gov't (AID)	867.8	140.2	160.5	184.9	185.0	1,538.4
TOTAL	1,528.6	273.4	314.9	346.5	350.5	

Notes: \* Includes all significant governmental and private sources, including all bilateral and multilateral grant assistance, and excluding capital contributions to the World Bank Group.

‡ Reporting periods are those of each funding source; amounts shown represent commitments/obligations or expenditures/disbursements, according to the reporting practice of each funding source; exchange rates employed were those in effect when the assistance was reported. Totals, therefore, are not strictly comparable between sources or periods.

<sup>e</sup> Signifies "estimated" (on the basis of 1980 UNFPA pledges).

MULTILATERAL SOURCES OF POPULATION ASSISTANCE  
 (in \$ millions)

	1965-76	1977	1978	1979	1980	Cumulative Thru 1980
UNFPA	299.7	35.7	102.3	111.7	125.7	725.6
World Bank Group*	117.3	29.5	72.0	102.0	111.0	432.3
IPPF	179.5	38.3	45.7	46.6	50.3	360.4

Notes: \* Assistance from the World Bank Group differs from funding provided by UNFPA and IPPF in two major ways: (1) it represents loan, rather than grant, assistance, and the numbers shown indicate loan agreements, not disbursements (which occur over considerably longer periods); (2) loan assistance is provided to far fewer countries than grant assistance—i.e., no more than 10% of the countries that receive grant assistance on a regular basis ever receive any loan assistance.

TABLE 4

TWENTY-EIGHT COUNTRIES WITH 25 MILLION OR MORE POPULATION IN 1980, THEIR RESPECTIVE BIRTH PERCENT AND CUMULATIVE SHARE TO TOTAL NUMBER OF BIRTHS OF THE WORLD, AND SHARE OF TOTAL LDC BIRTHS BY 19 LARGEST DEVELOPING COUNTRIES

Country	Population (millions)	Birth Rate	Births (millions)	Country Births As % of World Births		Country Births of Total LDC Births	
				Percent	Cumulative	Percent	Cumulative
1.* India	676	34	23.0	19.4	19.4	22.8	22.8
2.* China	977	17	16.6	14.0	33.4	16.5	39.3
3.* Indonesia	144	35	5.0	4.2	37.6	5.0	44.3
4. U.S.S.R.	266	18	4.8	4.0	41.6	-	-
5.* Brazil	122	36	4.4	3.7	45.3	4.4	48.7
6.* Bangladesh	91	46	4.2	3.5	48.8	4.2	52.9
7.* Nigeria	77	50	3.9	3.3	52.1	3.9	55.8
8.* Pakistan	86	44	3.8	3.2	55.3	3.8	60.6
9. United States	223	16	3.6	3.0	58.3	-	-
10.* Mexico	68	37	2.5	2.1	60.4	2.5	63.1
11.* Vietnam	53	41	2.2	1.9	62.3	2.2	65.3
12.* Iran	39	44	1.7	1.4	63.7	1.7	67.0
13.* Ethiopia	33	50	1.7	1.4	65.1	1.7	68.7
14. Japan	117	14	1.6	1.3	66.4	-	-
15.* Philippines	48	34	1.6	1.3	67.7	1.6	70.3
16.* Turkey	46	35	1.6	1.3	69.0	1.5	71.9
17.* Egypt	42	38	1.6	1.3	70.3	1.6	73.5
18.* Thailand	47	28	1.3	1.1	71.4	1.3	74.8
19.* Burma	34	39	1.3	1.1	72.5	1.3	76.1
20. Zaire	29	46	1.3	1.1	73.6	1.3	77.4
21.* South Korea	38	23	0.9	0.8	74.4	0.9	78.3
22.* Colombia	27	29	0.8	0.7	75.1	0.8	79.1
23. France	54	14	0.8	0.7	75.8	-	-
24. United Kingdom	56	13	0.7	0.6	76.4	-	-
25. Poland	36	19	0.7	0.6	77.0	-	-
26. Italy	57	12	0.7	0.6	77.6	-	-
27. West Germany	61	10	0.6	0.5	78.1	-	-
28. Spain	38	16	0.6	0.5	78.6	-	-
Total, listed Countries	3,585	26.1	93.5	78.3	78.8		
Total LDCs	3,295	30.7	100.8	84.9	84.9	100.0	100.
Total World	4,414	26.9	118.7	100.0	100.0		

\*Indicates Developing Countries

Table 5

## Comparison of Population Program Expenditures and Various Demographic Indicators

	1980 No. of MIRA (000)	Latest Contra- ception (Inc. Trad) Rate %	1980 MIRA Using (000)	1981 CDR 1/ 1/	1980 INPUTS				Total Inputs (000)	Expendi- tures per MIRA	Cost per User
					Bilateral (000)	A.I.D. 2/ Central (000)	Host 3/ Country (000)	Other 4/ Organi- zations (000)			
<b>MESA</b>											
Egypt	6,430	20	1,200	41	10,000	1,956	11,203	10,877	34,116	5.23	26.49
Jordan	400	23	112	46	0	411	N.A.	2,106	2,517	5.15	22.47
Morocco	3,254	7	229	43	2,920	727	0,000	1,675	13,322	4.10	50.43
Tunisia	1,006	32	322	33	1,615	1,706	2,740 5/	2,256	8,317	0.20	25.03
<b>ASIA</b>											
Bangladesh	16,764	8	1,341	46	6,700	4,655	22,000	11,771	45,126	2.69	33.65
India	120,695	24	30,807	36	13,000	762	175,000	37,371	226,935	1.76	7.35
Indonesia	24,462	20	6,049	35	19,000	1,791	49,700	15,716	86,207	3.52	12.59
Korea, South	5,931	54	3,203	23	0	725	16,108	10,137	27,050	4.56	0.44
Malaysia	2,112	36	760	31	0	151	16,100 5/	7,252	16,365	7.75	21.53
Nepal	2,643	2	52	44	1,900	705	4,145	3,025	10,575	4.00	203.36
Philippines	6,400	38	2,432	34	2,491	1,154	23,500	10,442	37,507	5.07	15.45
Sri Lanka	2,216	33	731	29	0	741	1,210 5/	4,252	6,205	2.73	0.49
Thailand	6,939	53	3,678	28	2,200	2,205	10,914	12,652	28,051	4.04	7.62
<b>LATIN AMERICA</b>											
Brazil	16,210	(35) 6/	(5,679)	32	0	4,634	(1,400) 5/	4,662	10,636	(.66)	(1.07)
Colombia	3,444	50	1,722	29	0	1,986	2,100	3,990	8,076	2.34	4.68
Costa Rica	309	65	201	32	304	256	2,496	556	3,302	10.69	16.43
Dominican Republic	742	33	245	34	0	210	317	3,294	3,021	5.15	15.54
Ecuador	1,058	6	63	42	51	435	4,460 5/	1,352	6,296	5.35	99.94
El Salvador	602	34	205	39	933	411	4,030	2,677	8,051	13.37	39.27
Guatemala	1,040	18	107	43	874	1,751	5,520 5/	1,146	9,291	8.93	49.68
Haiti	700	5	35	43	1,530	342	1,200 5/	705	3,057	5.51	110.20
Honduras	408	12	59	47	524	855	410	1,215	3,002	6.15	50.88
Jamaica	274	50	159	27	819	275	1,306	2,287	4,767	17.40	29.90
Mexico	9,392	42	3,945	33	0	7,725	40,207	5,410	61,342	6.53	15.55
Panama	274	61	167	20	154	201	2,505	1,434	4,434	16.18	26.55
Paraguay	303	24	92	34	0	296	250 5/	1,507	2,055	5.36	22.34
Peru	2,414	31	740	39	339	1,015	1,220 5/	2,183	5,251	2.17	7.02
<b>AFRICA</b>											
Burundi	703	3	21	47	0	96	N.A.	601	697	.95	33.19
Ghana	1,069	4	74	48	0	564	1,235	1,015	2,016	1.51	30.05
Guinea	932	5	47	46	0	0	N.A.	500	500	.55	10.64
Kenya	2,355	7	165	53	1,233	940	3,750 5/	5,055	11,016	5.02	71.61
Liberia	305	1	30	50	50	425	650 5/	1,157	2,282	7.40	76.06
Mauritius	140	52	73	28	0	176	800 5/	816	1,736	12.79	23.78
Sierra Leone	643	5	32	46	0	362	134	1,047	1,545	2.40	40.28
Swaziland	126	3	4	47	150	136	130	1,367	1,783	14.15	445.75
Tanzania	3,267	3	97	46	130	182	1,152	1,005	3,345	1.03	34.90
Zaire	5,556	5	278	46	0	761	N.A.	1,030	1,841	.33	6.60

1/ Headings MIRA, Contr. Rate, CDR from Population Reference Bureau "1981 World Data Sheet" & "1980 Family Planning & Marriage" Sheet.  
 2/ A.I.D. FY 82 Annual Budget Submission; Host Country-Population Officer survey.  
 3/ This data from A.I.D. mission submissions and various sources includes Government expenditures for health in some cases.

4/ Other organizations - 1980 UNFPA Inventory of Population projects around the world. This includes a large amount of construction loans from the World Bank and a large amount of support for census and demographic expenditures by UNFPA.  
 5/ UNFPA Figures.  
 6/ Estimate Average of five states.  
 ( ) Incomplete Information.

Table 6

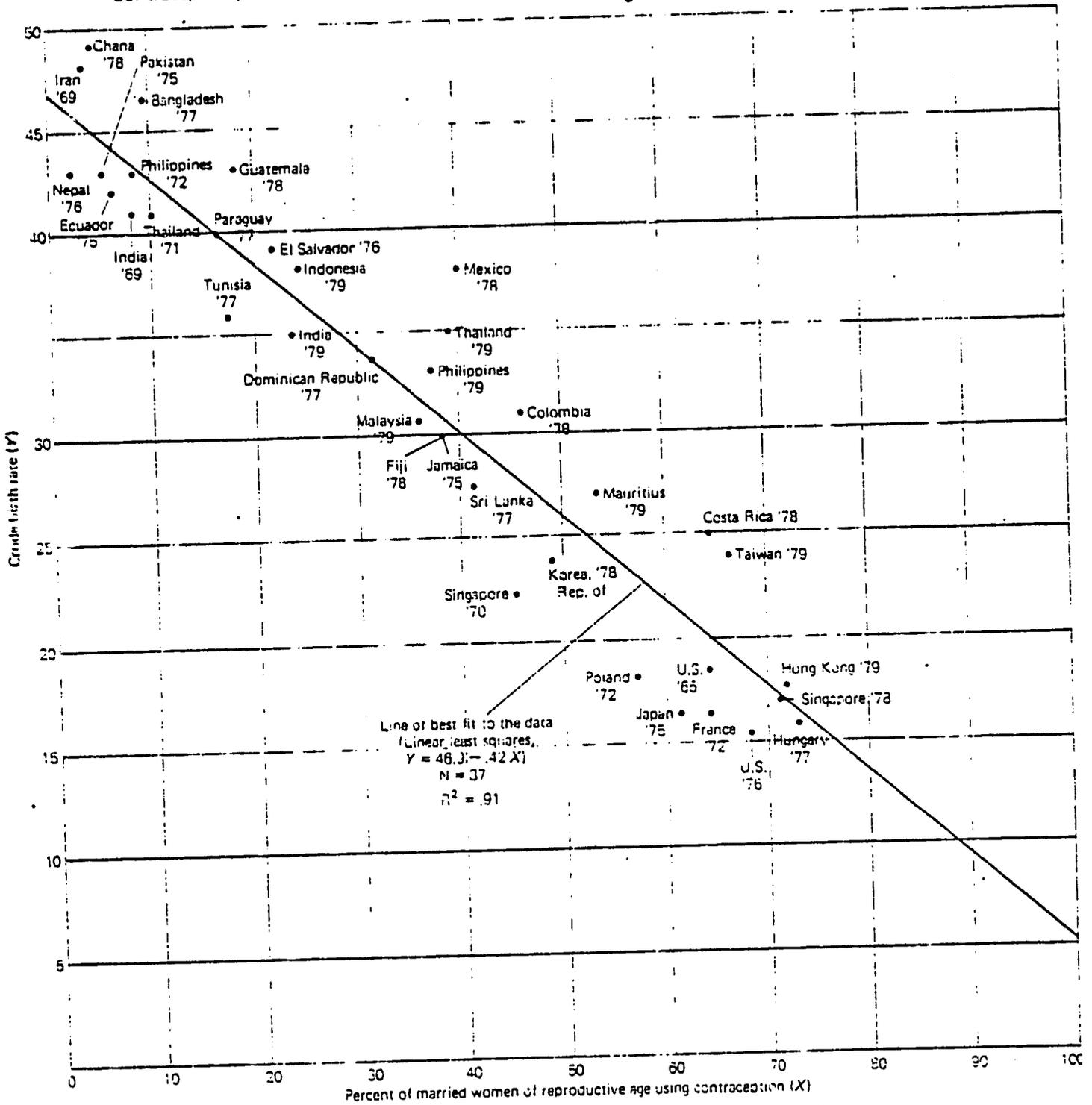
Projections of Markets for Fertility Control Services, 1975-2000.  
in the Developing World, excluding China  
in (000,000)

1. Females, 15-49, in the Developing World, 1975-2000

	1975	2000	c h a n g e absolute per cent	
All countries	685	1,267	582	85
China	225	358	133	59
All, excl. China	460	909	449	98

Figure

Contraceptive prevalence rates among married women of reproductive age and crude birth rates one year later



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