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THE ECONOMIC GAINS AND COST OF EXPANDING THE NUMBER OF FWAs
EMPLOYED BY THE NATIONAL FAMILY PLANNING PROGRAM

George Simmons
Deborah Balk
Ubaidur Rob

MCH-FP Extension Project
International Centre for Diarrhoeal Disease Research, Bangladesh
G.P.O. Box 128
Dhaka, Bangladesh

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ABSTRACT

The research literature has consistently suggested that among the various cadres of workers working on family planning in Bangladesh, the FWAs seem to be relatively effective. Partly as a result of these findings, the Third Population Project of the World Bank and the Third Five Year Plan, have argued that 10,000 additional FWAs should be hired for the program. The proposal is that these additional workers would be hired in five groups of 2,000 per year beginning in 1987. This note examines the economic costs and benefits of adding the first set of workers in 1987. Economic gains are measured both in terms of the demographic impact of family planning acceptance as well as the economic gain of a birth prevented. Economic costs are measured in terms of the direct and indirect additional cost of the new FWAs -- salaries and benefits, training, contraceptives and other supplies. We have found in the first year after all five groups of new workers are in the field, given a gradual realization of the benefits, the ratio of benefits to costs peaks at 4.24. Further, this ratio is believed to underestimate the benefits. Thus, this analysis suggests that the gains of additional workers far outweigh the costs.

Despite more than a decade of fairly intensive family planning activity, the birth rate in Bangladesh remains high. Numerous suggestions have been made about ways of improving the performance of the family planning program, but there seems to be little agreement on complete solutions. The research literature has consistently suggested that among the various cadres of workers working on family planning, the FWAs seem to be relatively effective. As a result of these findings, the Third Population Project of the World Bank and the Third Five Year Plan, have argued that 10,000 additional FWAs should be hired for the program. The proposal is that these additional workers would be hired in five groups of 2,000 per year beginning in 1987. This note examines the economic costs and benefits of adding the first set of workers in 1987. The conclusion can be extended to the full five year program.

I. The Economic Gains from Hiring Additional FWAs

We will estimate in two parts the economic gains from hiring FWAs. First we will assess the demographic impact that these additional workers are likely to have. Second, we will combine this information with a separate analysis of the economic gains from family planning. Thus, the economic value of hiring additional FWAs is the product of the demographic impact of the family planning acceptance which they bring about, measured as births prevented, and the economic gains to Bangladesh of preventing a birth.

The assumption that increasing the number of FWAs will lead to high contraceptive use is based on research concerning the importance of contacts between FWAs and their village clients. Recent empirical research carried out by the Extension Project of the ICDDR,B has suggested that increasing the number of contacts between FWAs and village households leads to an increase in contraceptive use, even when the underlying trend and the special characteristics of households are taken into account. In a simulation exercise, Phillips and Koenig estimate that a one third increase in FWA contacts would lead to an increase the national level of contraceptive prevalence by 2.08% even if there was no particular training or system of support to increase FWA productivity. (See paper by J. Phillips and M. Koenig attached to this note.) The increase would be more if training and management support were available. Since efforts are also planned to increase management capabilities, a 2.08% increase in prevalence would seem to be a minimal estimate of the impact of this number of additional contacts.

What proportionate increase in contacts would one expect with the projected increase in the number of FWAs? Without special training or new supervisory efforts one might expect the work patterns of the new FWAs to be similar to those of FWAs who had worked in the program for longer periods of time. In fact, since an increase in the number of FWAs should permit workers to live closer to their clients, on average the planned increase in the FWA workforce may decrease the amount of travel time and increase workers' productivity. An increase of the number of

FWAs by 2,000 as planned for 1987 would constitute a 14.8% increase on the 13,500 FWAs currently in position. If we assume that these new workers will increase contacts proportionately, there should be a 14.8% increase in worker/client contacts. An increase of this magnitude should lead to a 0.924%,⁽¹⁾ increase in contraceptive prevalence.

If there will be 17.137 million eligible couples in 1987 (based on projections from Planning Commission figures) and if prevalence is increased by 0.924 percentage points (e.g., from 25% to 25.924%) as a result of the increase in FWA density, there will be an increase of 158,346 contraceptive users in 1987. This increase in the number of users would continue as long as the additional FWAs continued to work. This estimate, which is based on the observations of long term relationship assumes that the new FWAs will work at the same pace and be equally effective as existing FWAs in recruiting contraceptive users. In fact, this statistic assumes that the effect of adding the new FWAs will take place immediately. Since this number implies that there will be 79 new users per additional worker, it may be more realistic to assume that the impact of the new FWAs takes five years to reach full measure. Figure 1 shows the general pattern of increase assumed in this estimation.

If we assume further that the extra acceptors are distributed by method as were contraceptive users in the 1983 CPS, then the distribution would look as follows. (See Table 1)

$$\begin{array}{r}
 \text{-----} \\
 (1) \quad 14.8 \quad X \\
 \quad \quad \quad \quad \quad = \quad \text{---} \\
 \quad \quad \quad 33.3 \quad 2.08
 \end{array}$$

To estimate the economic gains associated with these users, the contraceptive use figures must be translated into measures of demographic change. Ideally this translation would be done with a complex demographic model that takes into account the age distribution of contraceptive users and a wide range of other factors. In the absence of such a model we propose to use a set of impact weights drawn from international experience applied to Bangladesh. The unit of analysis is the birth prevented. Table 2 translates the number of users by method into births prevented. Note that in this preliminary calculation there is no adjustment for contraceptive effectiveness. In making these calculations, it is assumed that contraceptive users begin use on January 1 and finish on December 31, 1987. The emphasis is on users generated by the additional workers rather than new adopters. No special adjustment, however, is made for the longer term impact of the users of sterilization or IUD.

Estimating the economic gains from this activity involves complex assumptions. The paper by Phillips and Koenig appended to this report goes through an exercise of this kind in detail. The recommended estimate of the value of preventing a birth in Bangladesh in 1983 is Tk. 10,000. If we assume that this figure is a good approximation and also holds for 1988 and that the full impact of the additional workers is felt immediately, then the addition of 2,000 FWAs to the family planning staff in 1987 will generate benefits of Tk. $10,000 \times 45,242$. This figure amounts to Tk. 226,209 per worker added in the first year alone. If we

assume that the impact of the additional workers is gradual, say 20% of the total expected value for the first year, then the number may be less. In the first year, following the middle path of figure 1, the benefits would equal Tk. 45,242. For the four succeeding years, the gradual estimates have been scaled in 20% segments, so 100% of the benefits are realized by the fifth year following the advent of the new workers. In either case there will be additional benefit in later years. Table 3, calculates the benefits for a full 10 years of having the additional workers. To get an assessment of the implications of this figure we need to take account of the costs of adding the workers.

II. The Cost of Adding FWAs to the Current Family Planning Staff.

The costs of adding FWAs to the program staff consist of salary and other benefits, training costs and ancillary costs involved in recruiting and administering the program with the additional worker. The additional contraceptive users recruited by the FWAs will also need to be supplied with contraceptives and these cost money.

To estimate the costs we begin with the salary of the FWA which is set at Tk. 600/month times 13 months payments in a year. In addition to her salary, the FWA receives housing and other allowances which amount to approximately 40% of her salary. Moreover, each year, her salary is incremented by Tk. 30/month. We have estimated that the training and supervisory costs associated with the program will equal the cost of salary and benefits. Table 4 shows the cost of these salaries. We believe these figures overestimate the costs, but most detailed estimates

are lacking.

In addition to the salary and support costs, there are costs associated with the contraceptives used by the additional acceptors. Using the figures for contraceptive users provided in Table 1 we estimate the costs as shown in Table 5. Table 6 shows these costs, per worker and adjusted annually, projected for 10 years.

Summing the results from Tables 4, 5 and 6 gives an overall estimate of the 10 years cost of adding FWAs to the system. These figures are summarized in Table 7.

III. Conclusions.

The exercise undertaken above suggests that the additional FWAs will contribute considerably more economic gains than they cost. Moreover these estimates probably understate the gains in three ways.

First, as mentioned earlier, no adjustment has been made for the use of long term methods (i.e. sterilization and IUD). In other studies, the benefits of sterilizations range from 5 - 7 times and for IUDs 2 - 2.5 times greater than our estimates.

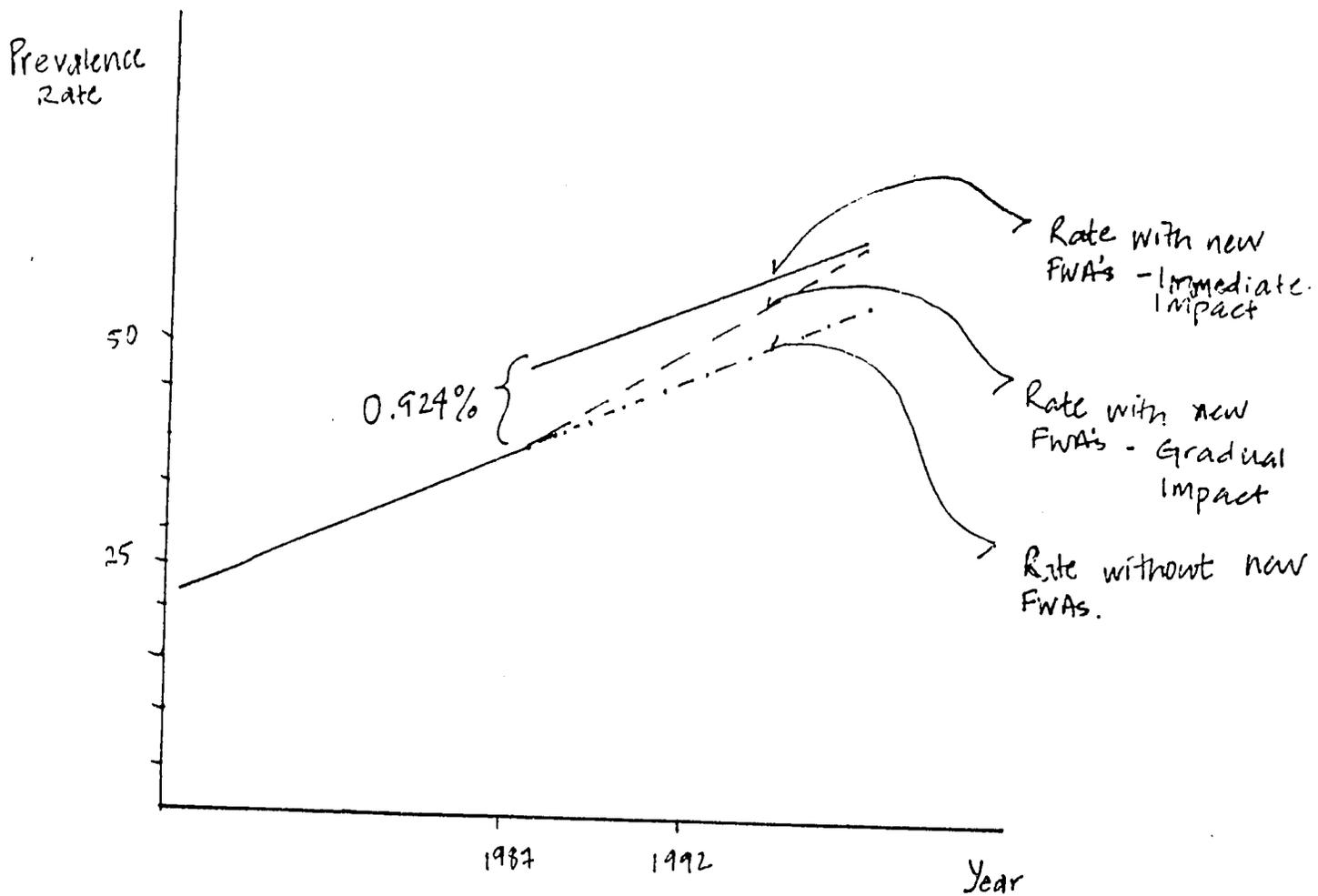
Second, there are indications that if FWAs are effectively supervised, trained and supported that their productivity can be larger than that estimated above. The ICDDR,B estimates provided in the paper by Phillips and Koenig suggest that additional prevalence resulting from the additional workers may exceed five

percent. Many sensible suggestions have been made for improving worker productivity. Implemented, these changes would lead to increases in acceptance that would be additive to the effects discussed in earlier sections.

Third, FWAs make contributions to health and serve rural women in important ways that one does not take into account in the estimates based on family planning alone.

A final look at Table 7 helps us to make two additional conclusions. When the benefit-cost ratio begins to decline, it is time to hire additional FWAs, if the new level of benefits is to be maintained. The cost ratio peaks in the year 1993 given the gradual estimate and 1988 for the immediate estimate. The decline of this ratio implies that rate of population will still be growing faster than the rate of adding new workers. Eventually, the benefits will equal zero. In the absence of the program, the benefit-cost ratio of the intervention is zero as seen in 1987, where no new workers were hired in the previous year. Thus, the benefits accrue to zero over time even with the hiring of more FWAs; whereas the benefits are zero or possibly even negative at present without intervention at all.

FIGURE 1. The Pattern of Change in Prevalence as a Result of Adding 2,000 FWAs in 1987.



NB: Not drawn to scale.

Table 1: Estimation of the Additional Contraceptive Users in 1987 Resulting from Increase in Number of FWAs

Method (1)	% of Eligible Women Using Method* (2)	% of All Users Using Method** (3)	Expected Number of Additional Users in 1987 (4)
Oral Pill	3.3	20.37	32,256
Condom	2.7	16.67	26,391
Vaginal Method	0.3	1.85	2,932
Injection	0.2	1.23	1,955
IUD/CuT	1.0	6.17	9,774
Tubectomy	6.2	38.27	60,602
Vasectomy	2.5	15.43	24,436
Total	16.2	100.0	158,346

* Source: CPS, 1983

** Based on the projection of 17.37 million eligible women in 1986.

Table 2: Estimate of Annual Demographic Effect from Contraceptive Use.

Method	CYP per Woman	CYPs/BP	Birth Prevented per User	No. of Additional Births Prevented in 1988 by Addition of 2000 FWAs in 1987 (5)
(1)	(2)	(3)	(4)	(5)
Oral Pill	1.0	3.5	0.286	9,216
Condom	1.0	3.5	0.286	7,540
Vaginal Method	1.0	3.5	0.286	838
Injection	1.0	3.5	0.286	559
IUD/CuT	1.0	3.5	0.286	2,793
Tubectomy	1.0	3.5	0.286	17,315
Vasectomy	1.0	3.5	0.286	6,982
Total				45,242

Table 3. The Benefits of Additional FWAs per FWA.

Years (1)	Gain Assuring Gradual Impact (2)	Gain Assuring Immediate Full Impact (3)
1987	0	0
1988	45,242	226,209
1989	92,836	232,090
1990	142,875	238,124
1991	195,452	244,316
1992	200,534	250,668
1993	257,185	257,185
1994	263,872	263,872
1995	270,733	270,733
1996	277,772	277,772
Total Gain in 10 Years	1,746,500	2,260,968

Table 4: Salary and Support Cost of Hiring Each Additional FWA

Year	Salary	Allowances	Training & Admn. Cost	Monthly Total	Grand Total =(5)x13 (6)
(1)	(2)	(3)	(4)	(5)	(6)
1987	600	240	840	1,680	21,840
1988	630	252	882	1,764	22,932
1989	660	264	924	1,848	24,024
1990	690	276	966	1,932	25,116
1991	720	288	1,008	2,016	26,208
1992	750	300	1,050	2,100	27,300
1993	780	312	1,092	2,184	28,392
1994	810	324	1,134	2,268	29,484
1995	840	336	1,176	2,352	30,576
1996	870	348	1,218	2,436	31,668
Total					267,540

Table 5: The Cost of Contraceptives or Contraceptive Services for the Additional Users Generated by FWAs

Method (1)	# of Contraceptives or Service Units per CYP (2) a	Cost per Service Unit (Taka) (3) b	Users (4)	Total Cost (5)
Oral Pill	14	3.99	32,256	1,900,673
Condom	250	0.37	26,391	2,449,415
Vaginal Method	5.33	41.60	2,932	653,306
Injection	4	21.45	1,955	167,729
IUD/CuT	1	20.08	9,774	196,222
Tubectomy	1	660.00	60,602	39,997,027
Vasectomy	1	412.50	24,436	10,079,896
Total				55,344,267

Source: a) Simmons, Rob and Bernstein; "An Economic Analysis of Family Planning in Bangladesh."

b) Balk, "Documentation Note #54c: Matlab MCH-FP Cost-Effectiveness Analysis Background Note #2: Methods of Family Planning"

Table 6. The Cost of Contraceptives for New Acceptors Generated by each of the New FWAs.

Years	The Cost of Contraceptives
1987	27,672
1988	28,392
1989	29,130
1990	29,887
1991	30,664
1992	31,462
1993	32,280
1994	33,119
1995	33,980
1996	34,863

Table 7. The Total Costs and Benefits per FWA.

Years	Costs			Benefits		Benefits/Costs Ratio	
	Salary & Support Cost	Contra-ceptive Costs	Total Costs	Gradual A	Immediate B	A	B
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1987	21,840	27,672	49,512	0	0	0.00	0.00
1988	22,932	28,392	51,324	45,242	226,209	0.88	4.41
1989	24,024	29,130	53,154	92,836	232,090	1.75	4.37
1990	25,116	29,887	55,003	142,875	238,124	2.60	4.33
1991	26,208	30,664	56,872	195,452	244,316	3.44	4.30
1992	27,300	31,462	58,762	200,534	250,668	3.41	4.27
1993	28,392	32,280	60,672	257,185	257,185	4.24	4.24
1994	29,484	33,119	62,603	263,872	263,872	4.22	4.22
1995	30,576	33,980	64,556	270,733	270,733	4.19	4.19
1996	31,668	34,863	66,531	277,772	277,772	4.18	4.18