

First, the greater need for fertility control NFC leads to a larger fraction of service output allocated to fertility control FSAFC. The assumed relationship between these two variables is shown in Figure 2-75. This allocation includes all economic and institutional aspects of fertility control technology—basic research and development, training and salaries for family-planning personnel, educational programs, clinics, and equipment. The fraction of service allocated to these purposes is then multiplied by the total value of service output per capita SOPC each year to give the dollar value of fertility control allocations per capita FCAPC.

FCAPC, K=FSAFC, K*SOPC, F 47, A
 FCAPC - FERTILITY CONTROL ALLOCATIONS PER CAPITA
 (DOLLARS/PERSON-YEAR)
 FSAFC - FRACTION OF SERVICES ALLOCATED TO FERTILITY
 CONTROL (DIMENSIONLESS)
 SOPC - SERVICE OUTPUT PER CAPITA (DOLLARS/PERSON-
 YEAR)
 FSAFC, K=TABHL(FSAFCT, HFC, E, 0, 10, 2) 48, A
 FSAFCT=0/.905/.015/.025/.03/.035 48.1, T
 FSAFC - FRACTION OF SERVICES ALLOCATED TO FERTILITY
 CONTROL (DIMENSIONLESS)
 TABHL - A FUNCTION WITH VALUES SPECIFIED BY A TABLE
 FSAFCT - FSAFC TABLE
 HFC - NEED FOR FERTILITY CONTROL (DIMENSIONLESS)

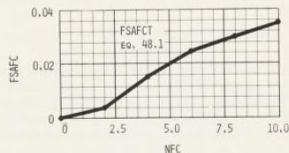


Figure 2-75 Fraction of service output allocated to fertility control table

Recent values of fertility control allocations per capita FCAPC in several nonindustrialized countries are shown in Figure 2-76. The last column indicates proposed per capita expenditures for a more modern and complete family-planning program; the annual expenditures in these proposed programs range from \$0.32 to \$1.65 per person in the population per year (Taylor and Berelson 1971).

We assumed in World3 that there is a third-order delay between the allocation of fertility control expenditures and the development and implementation of low-cost, effective fertility control throughout the population. Because this delay involves both time for research and time for change of deeply ingrained social and private behavior, we assumed a rather long delay time of 20 years, the same as the health service impact delay HSID. Thus, after a given expenditure of fertility control allocations per capita FCAPC, there is a delayed increase in established and accepted fertility control facilities per capita FCFPC.

Country	Family Planning as Percentage of Total Government Budgets	Annual per Capita Budget for Family Planning (all sources—current dollars)	Per Capita Costs of Proposed Program (dollars/ person-year)
Fiji (1970)	0.29	0.23	
Guatemala (1971)	0.07		
Ghana (1971)		0.11	0.93
Honduras (1972)	0.06		
Hong Kong (1970)		0.079	
India (1966-1971)	2.0	0.146	0.32-0.36
Indonesia (1971)		0.064	0.41
Iran (1971)	0.07	0.24	0.92
Kenya (1970)	0.01	0.085	1.65
Malaysia (West) (1970)	0.10	0.086	
Mauritius (1971)	0.12	0.25	
Morocco (1972)	0.04	0.026	
Nepal (1970)	0.14	0.035	
Pakistan (1965-1970)	0.5	0.118	
Philippines (1971)	0.43	0.073	0.60
Singapore (1971)	0.02		
South Korea (1971)	0.12	0.18	
Taiwan (1972)	0.20	0.068	
Thailand (1971)	0.13	0.14	0.38
Turkey (1969)	0.05	0.046	0.55

Figure 2-76 National family-planning expenditures
 Source: Taylor and Berelson 1971

FCFPC, K=DLINF3(FCAPC, K, HSID) 46, A
 FCFPC - FERTILITY CONTROL FACILITIES PER CAPITA
 (DOLLARS/PERSON-YEAR)
 DLINF3 - THIRD-ORDER EXPONENTIAL INFORMATION DELAY
 FCAPC - FERTILITY CONTROL ALLOCATIONS PER CAPITA
 (DOLLARS/PERSON-YEAR)
 HSID - HEALTH SERVICES IMPACT DELAY (YEARS)

Fertility control effectiveness FCE is defined as a nonlinear function of fertility control facilities per capita FCFPC, as shown in Figure 2-77. It is assumed in this relationship that fairly modest per capita investments in fertility control facilities can lead to significant improvements in fertility control effectiveness. A CLIP function in the FCE equation allows the model operator to set FCE to 1.0 at any specified time FCEST, to test the effect of 100 percent effective fertility control on the population system.

FCE, K=CLIP(1.0, (TABHL(FCE, FCFPC, E, 0, 3, .5)), TIME, E, 45, A
 FCEST) 45.1, C
 FCEST=4000 45.2, T
 FCE=75/.85/.9/.95/.98/.99/1
 FCE - FERTILITY CONTROL EFFECTIVENESS
 (DIMENSIONLESS)