a specific, separate influence on fecundity. These specific influences are not well enough understood to represent them separately at this time. The exact relationship assumed between LE and MTF is given by the following equations and illustrated in Figure 2-60.

```
MTF.K=MTFN*FM.K                                          33, A
MTFN=12                                                  33.1, C
    MTF    - MAXIMUM TOTAL FERTILITY (DIMENSIONLESS)
    MTFN   - MAXIMUM TOTAL FERTILITY NORMAL
             (DIMENSIONLESS)
    FM     - FECUNDITY MULTIPLIER  (DIMENSIONLESS)

FM.K=TABHL(FMT,LE.K,0,80,10)                             34, A
FMT=0/.2/.4/.6/.8/.9/1/1.05/1.1                          34.1, T
    FM     - FECUNDITY MULTIPLIER  (DIMENSIONLESS)
    TABHL  - A FUNCTION WITH VALUES SPECIFIED BY A TABLE
    FMT    - FM TABLE
    LE     - LIFE EXPECTANCY (YEARS)
```

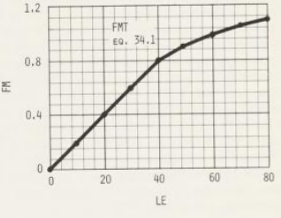

Figure 2-60 Fecundity multiplier table

The fecundity multiplier FM is mathematically a modifier of a constant maximum total fertility normal MTFN. Like all "normal" constants in the model, this MTFN is an arbitrary number that must be defined consistently with its modifying table function. We chose MTFN to equal 12 children per woman, the probable maximum total fertility of the Hutterite population. Thus when life expectancy equals that of the Hutterites (about 60 years?) the fecundity multiplier must equal 1.0 to give a maximum total fertility of 12.

It is assumed that the Hutterite fertility might have increased by 10 percent with better medical care, so the maximum fecundity generated by this function, with an 80-year life expectancy, is 13.2 children (in agreement with the calculations of Bourgeois-Pichat 1965). At a life expectancy of 40 years, FM = 0.8 and MTF = 9.6 children. Below LE = 40, maximum total fertility is assumed to decrease linearly to zero.

To relate this postulated fecundity multiplier to the observed total fertility of preindustrial societies, Figure 2-61 was derived from data assembled by Moni Nag (1968). Life expectancies were calculated on the basis of observed (usually guessed) infant mortalities, using model life tables derived by the United Nations (U.N. 1956). It must be emphasized that all the numbers given in Figure 2-61 are subject to uncertainty and error, both in the original data-gathering processes and in the conversion from infant mortality to indicated life expectancy. It is also fairly certain that none of the societies listed in the table have achieved their actual maximum total fertility—even the Hutterites practice some fertility limitation through late marriage. Nevertheless, these tentative data can at least define minimum fecundities. The fecundity multiplier table FMT must generate values of maximum total fertility MTF at all life expectancies that are at least as high as those actually observed. The postulated relationship does meet this requirement, as shown in Figure 2-62, where the observed fertilities are plotted on the same graph as the FM function included in the World3 equations.

Society	Estimated Total Fertility	Estimated Infant Mortality (deaths before age 1 per 1,000 live births)	Approximate Indicated Life Expectancy
Africa			
Ashanti	6.2	96	56
Ganda	3.1	169	41
Haya	3.7	274	24
Tallensi	6.0	150	45
Yako	3.0	150	45
America			
Havasupai	7.4	64	62
Hutterite	10.4	45	64
Navaho	7.8	124	50
Puerto Rico (1940)	6.8	115	51
Walapai	6.4	129	48
Asia			
Bengali Hindu	6.5	21	70
Bengali Muslim (low economic level)	4.4	59	62
Bengali Muslim (high economic level)	7.0	62	60
Lue	6.6	99	55
North Chinese	5.1	186	36
Taiwan	6.6	120	51
Pacific			
Dusun	5.0	168	41
Tabar	2.8	145	46

Figure 2-61 Total fertilities of preindustrial societies
Source: Derived from Nag 1968.