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Socio-Economic Determinants of Fertility and Mortality Decline in India

MORTALITY and fertility in the developing countries of Asia have undergone remarkable declines during the last few decades. Although India experienced a decline in its mortality right from 3921, the decline was much sharper between 1950 and 1970 followed by a slower decline in mortality during the I970's (Pathak and Murthy, 1983). The steep decline in the death rates after 1950 was due to several factors including virtual absence of famines and significant reduction in the incidence of epidemics like cholera, smallpox, malaria, etc., improved sanitary and drinking water conditions, increased agricultural production and advance in medical technology (ESCAP, 1982), Fertility, on the other hand, showed a steady, and *sometimes a slightly increasing, trend* right upto late 1950's. It started to decline from the mid '60's mainly due to the intensification of the family planning programme (Agarwala, 1977). Rise in literacy level, age at marriage, female participation rate in the non-agricultural activities and reduction in martial fertility specially at the advanced ages, due to the acceptance of family planning (mostly of sterilisation) seem to be among the factors underlying the recent decline in fertility in India (Jain and Adlakha, 1982). The existing levels of mortality, especially of inf;mt mortality, as well as of fertility are, however, much higher than those in many other developing countries of Asia. Even countries which started the official family planning programmes late in '60's and '70's, like Indonesia, Philippines and Malaysia, have experienced much steeper declines in their birth rates in the last 10 years or so.

A faster decline in mortality, followed by a comparatively slower decline in fertility, has accelerated population growth in India since 1950. A series of policies have been implemented from 1951 onwards to reduce the levels of both mortality and fertility. The goals of these policies have, however, changed from time to time. Even though, the gains of these policies are clearly visible in terms of reductions in birth and death rates over the decades, the existing levels of infant mortality, birth and death rates in India as a whole and in a large number of states are still above the targets stipulated earlier. The couple protection by all methods amounted to only 26 percent at the end of March 1984.

A number of factors are responsible for the current congruence of high fertility, high infant mortality and moderately high death rate in the country. India seems to have reached the second stage of fertility and mortality decline, after which further declines are possible only with improvement in the overall socio-economic conditions of the masses (Pathak, 1984; Srinivasan and Pathak, 1981). Even the decline in infant mortality, which is treated as a strong catalyst for motivating the couples to limit their family size is found negatively correlated with literacy and economic status of the couples. The utilisation of the available health and family planning services depends upon the favourable attitudes of the people concerned and this comes only after a certain threshold level of development or modernisation in their outlook is reached. The basic indicators of such a process can be identified systematically as literacy level, income, participation of women in labour force, available health facilities, communication services, transport facilities, etc. In order to embark on definite developmental programmes aimed towards engineering a simultaneous decline in mortality and fertility, it is very pertinent to understand the mechanism of interactions between them and the demographic and socio-economic factors.

To study this mechanism, we may choose suitable model stipulating a particular frame in which variables are interlinked. This is more desirable when we consider the relationships between mortality and fertility *vis-a-vis* different social and economic indicators. The objective of the present paper is accordingly three fold: (1) to find the important determinants of fertility and mortality in 1971 and 1981 respectively; (2) to see whether *there is any change in theimport*ance of determinants over time; and (3) to find whether there is any change in the importance of the determinants when a lag of 10 years is applied. Two conceptual models of fertility and mortality are used to identify the important socio-economic determinants of fertility and mortality respectively. The most convincing way of analysing the effect of each independent variable on the dependent variable is to use multiple regression analysis, especially path analysis. The technique of path analysis allows us to find out not only the direct effects but also the indirect effects via different intervening variables, if any, in addition to the total effects. In the present study, we have considered 12 of the major states in India for the analysis, each state being treated as a separate unit of observation. The selection of the states is based on the availability of the recent data on the determinants of fertility and mortality.[1] The main sources of data for the present study are censuses, sample registration bulletins and the year books of health and family welfare statistics.

The states vary not only in their socio-economic development but also in the decline in their birth and death rates. For instance, the adult literacy among the 12 States varied from 78.14 percent in Kcrala to 28.24 percent in Rajasthan in the year 1981. Likewise, the percentage of urban population varied from 35.03 in Maharashtra to 11.79 in Orissa, in 1981. The *CBR* and the *CDR*, on the other hand, varied from a level of 26.0 and *6.8* in Kerala to *39.5* and *16.4* in Uttar Pradesh respectively, circa 1981. From the scanning of the data on the different development variables it appears that while Kerala, Maharashtra and Punjab are well advanced, in development, Uttar Pradesh, Rajasthan and Madhya Pradesh are at the bottom. Even though the units of analysis are less in number, it is expected that the statcwise analysis may throw some light on the important determinants of fertility and mortality.

We have selected 1971 and 1981 years for the study because most of the published data on the different variables at the State level are readily available at these two years only. It is expected that there has been a considerable change in the socio-economic conditions of the different states over this period of 10 years.

Conceptual Framework

Ever since the family planning programme was introduced, a decline in fertility has been assumed to occur due to its impact, in addition to that attributable to socio-economic development. As such, any perfect conceptual model of the determinants of fertility is incomplete without accounting for the performance of the family planning programme as a determinant.

Figure 1 shows a simple conceptual model of the mechanism of fertility change. In the model, a decline in fertility is assumed as a result of better performance of the family planning programme, improvement in the health conditions, and socio-economic development. With the improvement in the health conditions there would be a reduction in the number of deaths, especially infant and child deaths. Thereby, the couples become surer of the survival of the children they beget. There will also be a heightened consiousness of the economic status of family. In addition to this, with a reduction in the infant mortality, the birth interval may enlarge as a result of an increase in the post-partum ammenorrhoea period following a live birth (Farah, 1982).

Further, in the present model the socio-economic development is assumed as

1. For a better analysis we could have considered the districts or **blocks as** the units **of** analysis, because the number of States considered is small. Unfortunately the data at the district **level for** all the determinants considered are not readily available.

a precondition for an improvement in the health conditions and the family planning programme performance leading to reduction in the fertility level. Various studies made in the past clearly show that a certain minimum level of socio-economic development is a must for a sustained decline in fertility (Pathak and Murthy, 1984; United Nations, 1965).

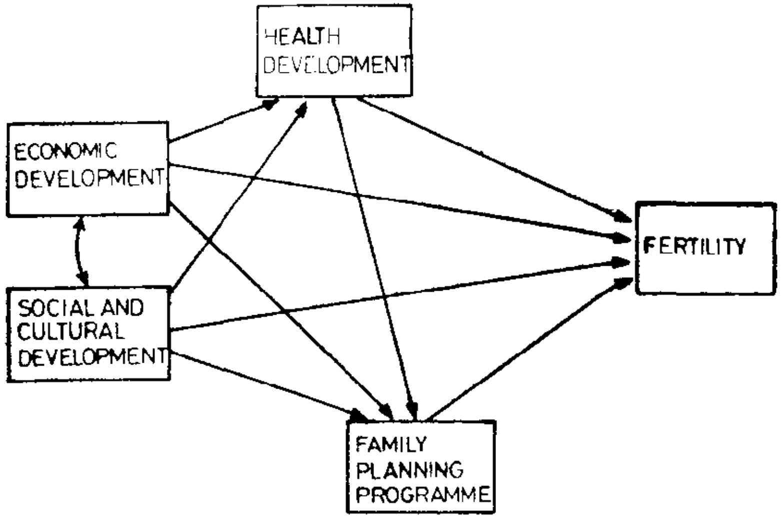


Fig. 1

Figure 2 presents a simple model of change in mortality. In this model, mortality is linked with the fertility, health and socio-economic development in a systematic way. Here it is assumed lhat for a decline in mortality, an

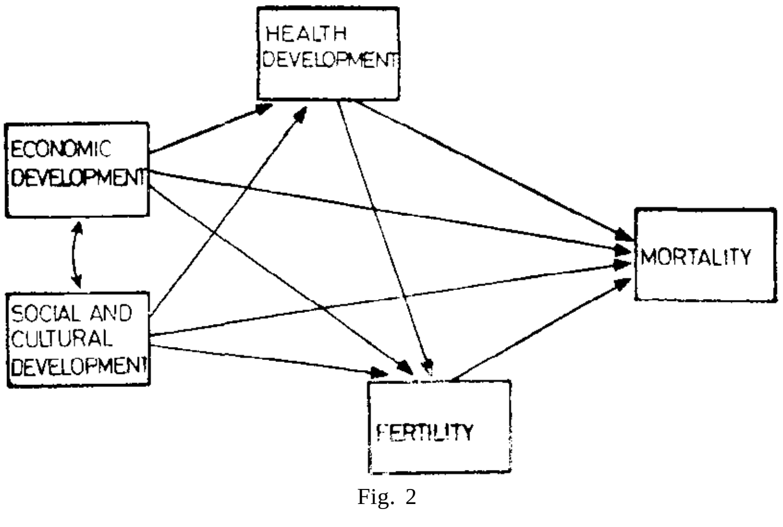


Fig. 2

earlier decline in fertility preceded by an improvement in the health and the socio-economic conditions is a necessary condition. High fertility and low economic status is associated with higher infant mortality.

While model I clearly represents the position of the present developed countries when they were in the middle of the demographic transition, it may also be said to represent the position of some of the presently developing countries. For instance, a considerable decline in infant and childhood mortality as a result of improved health conditions has been noticed in the countries of East and South East Asia before there was any rapid decline in their fertility (Siommons. 1983). However, model II may essentially represent only some of the present developing countries where the transition is taking place. There are certain regions in the world where infant mortality has declined before any decline in the fertility, for example, France and Germany. So, we may find out from model II the contribution of fertility towards the decline in *mortality. As the* states in India vary in respect of their levels of mortality and fertility and also in their demographic and socio-economic conditions, there is a possibility for the applicability of both these models.

The Data and the Variables

Even though, the sources noted earlier provide the required data for period covered, the reliability of the data is not quite good as each data generating system suffers from one or other defects. However, for the present study we have *had to collect the data on the* demographic events from the Sample Registration System. The data on socio-economic, and cultural variables, health and family planning programme have been mainly drawn from the censuses of 1971 and 1981 and the Health and Family Welfare Planning Programme Year Books respectively.

We have considered the crude birth rate *(CBR)* and the crude death rate *(CDR)* as the dependent variables for studing fertility and mortality, respectively. These two measures are robust in nature and are easily available. While selecting independent variables care had to be taken to cover the different aspects of development. They are indicators of health, education, status of women, income, performance of the family planning programme. From the policy point of view, selection of these indicators seems to be quite reasonable. We have used the same set of independent variables for studying changes in both fertility and mortality.

We have used hospital beds per 1,000 population *(HOSPBED),* infant mortality rate *(IMR)* and adult literacy rate (15 + *LIT)* as the indicators of health and literacy respectively. Indicators of status of women, income and performance of the family planning programme used here are the ratio of the male and female literate proportions (age 15 and above-MFLIT), per capita income at current prices in rupees, *(PRCPINC) and the percentage of couples effective-*

ely protected by all methods *(PCTCEP)*. Singulate mean age at marriage of females *(FSMAM)*, percentage urban *(PCTURB)* and the percentage of males aged 15-64 years, economically active in non-agricultural activities *(ECONMA}* are the measures of socio-economic development. As a matter of fact, each one of these variables has been used in different mortality and fertility determinant studies (United Nations, 1982; Srikantan, 1977) and these have been considered viable indicators of development-

Methodology

In our analysis, as a first step, all the values of the variables for each State have been expressed as a percent of the average value for the 12 State under consideration. This makes the variables comparable. The zero-order correlations among the new variables were then computed. As a next step, in order to find out the direct, indirect and total effects of different independent variables *on fertility and mortality, the two recursive path* models given *by* the following set of equations, are proposed.

Model I: Fertility Model:

$$CBR = PCTCEP + IMR \quad (1)$$

$$PCTCEP = f(PRCPINC, LIT, HOSPBED, PCTURB, ECONMA, MFLIT, FSMAM, IMR) \quad (2)$$

$$IMR = f(PRCPINC, LIT, HOSPBED, PCTURB, ECONMA, MFLIT, FSMAM) \quad (3)$$

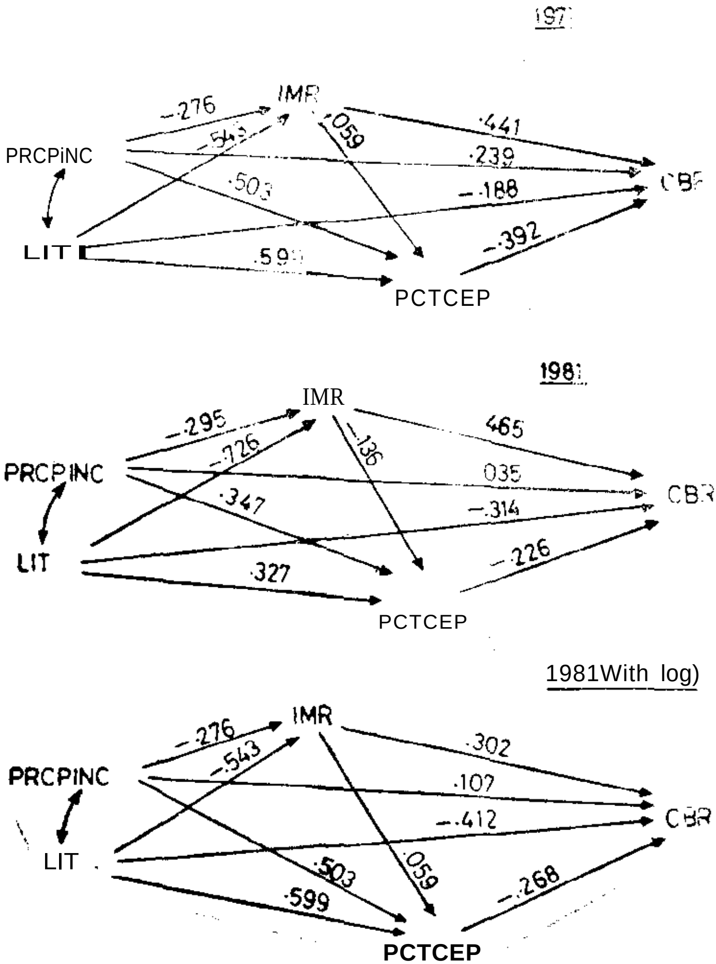
Model II: Mortality Model:

$$CDR = CBR+IMR \quad (1)$$

$$CBR = f(PRCPINC, LIT, HOSPBED, PCTURB, ECONMA, MFLIT, FSMAM, IMR) \quad (2)$$

$$IMR = f(PRCPINC, LIT, HOSPBED, PCTURB, ECONMA, MFLIT, FSMAM) \quad (3)$$

These models are based on the conceptual models given in Fig. 1 and Fig. 2. As the proposed models are recursive, the parameters of the models (the standardized beta coefficients or path coefficients) are estimated by using the ordinary least squares procedure. Once the estimated path coefficients are available, it is possible to find out the indirect and the total effects by use of the flowgraph method suggested by Huey-Tysh Chen (1983). "Flowgraph method allows analysis of the causal relationship between two variables without deriving a full set of equations. Flowgraph method can decompose the effects directly by using the path diagram when the estimated path coefficients are available" (Heise, 1975). For instance, in our analysis we may find out the indirect and total effects of adult literacy *(LIT}* on crude birth rate *(CBR}* when we have the direct effects (or the standardized beta coefficients) of *LIT* on *CBR, IMR* on *CBR, IMR* on *PCTCEP* and *PCTCEP* on *CBR.* We need the direct effect of *IMR* on *PCTCEP, IMR* on *CBR* and *PCTCEP* on *CBR* because in our model (Fig. 3) *LIT* affects the *CBR* indirectly through *IMR* and *PCTCEP.* Multiplication of the direct effects of *LIT* on *IMR* with *IMR* on *CBR, LIT* on *PCTCEP* with



Ffg. 3.

PCTCEP on *CBR* and *LIT on IMR* with *IMR* on *PCTCEP* and *PCTCEP* on CBR gives the indirect effects of *LIT* on CBR through IMR, *PCTCEP* and IMR and *PCTCEP* respectively. Adding of all these indirect effects gives the total indirect effect of *LIT on CBR.* The total of direct and indirect effects give the total causal effect of *LIT* on *CBR.* The deviation of the total causal effect from the total association (the correlation coefficient between the two variables) is the total noncausal effect of *LIT* on *CBR* (Alwin and Hauser, 1975).

However, the consideration or omission of the different paths in the path diagram depends on the value of that particular path. Generally, if the path coefficient is twice its standard error, it is said to be significant. If its value is approximately equal to its standard error, then also the particular path may be considered. The consideration of the insignificant paths (where the standard error of the path coefficient is far more than its path coefficient) may highly distort the results of the analysis and hence it is better to drop them.

Initially we took all the variables which are correlated highly with the dependent variables as the independent variables in the two models. However, we modified the models later on by dropping most of the independent variables due to their insignificant effects on one or the other dependent variables, namely *CBR, CDR, IMR* and *PCTCEP*. We have also found a change in the path coefficient of a particular variable while considering combinations of different independent variables. Finally, therefore, we considered only the variables of *PRCPINC, LIT, IMR* and *PCTCEP* as the independent variables. In *both the* models, these variables are the indicators of economic development, social development, health and family planning performances, respectively. The following equations characterise the two models in their modified form:

Model I: Fertility Model:

$$CBR - PCTCEP + IMR \quad (1)$$

$$PCTCEP =: f(PRCPINC, LIT, IMR\} \quad (2)$$

$$IMR = f(PRCPINC, LIT) \quad (3)$$

Model If: Mortality Model:

$$CDR = CBR\ 4 + IMR \quad (1)$$

$$CBR = f(PRCPINC, LIT, IMR) \quad (2)$$

$$IMR = f(PRCPINC, LIT) \quad (3)$$

These two models for 1971, 1981 and for 1981 with lag variables are represented by the Figures 3 and 4 respectively. Both for 1971 and 1981 the above models of fertility and *mortality* are *applied. The path* coefficients of different

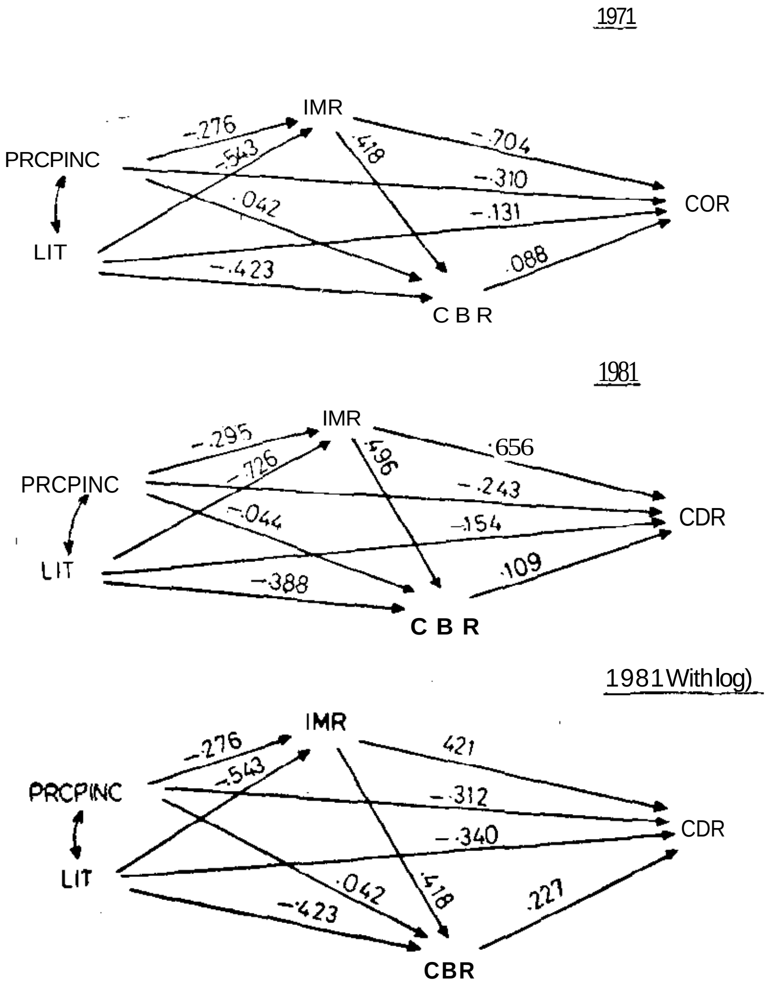


Fig.4

variables along with their standard errors, percentage variations explained and the multiple correlation coefficients are shown in Appendix Table I. While multiple correlation coefficients serve in estimating the residual path values, the percentage of variation explained indicates the extent of the fitness of the model under study to the observed data.

Results

Table 1 presents the correlation coefficients and the lagged correlation coefficients between *CBR, CDR* and the development variables for the years 1971 and 1981. It can be seen from the Table that (1) the direction of the zero-order

TABLE 1-CORRELATION COEFFICIENTS BETWEEN *CBR*. *CDR* AND THE DEVELOPMENT VARIABLES FOR THE YEARS OF 1971 AND 1981

Development *Variable*	*Year*	*CBR*		*CDR*	
		1971	*1981*	*1971*	*1981*
PRCPINC	1971	—13	—17	—56	—51
	1981	-24	—27	—57	—53
LIT	1971	—66	—74	—62	—76
	1981	—71	—77	—62	—76
HOSPBED	1971	—70	—79	—75	-92
	1981	—64	—75	—68	—85
PCTURB	1971	—43	—42	—32	—41
	1981	—41	—40	—32	—39
ECONMA	1971	—68	—74	—75	—88
	1981	—63	—70	—77	—87
MFLIT	1971	—63	—74	—69	—86
	1981	—71	—80	—68	—86
FSMAM	1971	—67	-76	—63	—78
	1981	—62	—73	—53	—71
IMR	1971	64	62	94	86
	1981	76	81	85	95
PCTCEP	1971	—57	—60	—63	—62
	1981	—61	—60	—63	—59

Note.. All correlation coefficients have been multiplied by 100.

correlations of the independent variables with both *CBR* and *CDR* is in the expected direction for both the years of 1971 and 1981; (2) the magnitude of the coefficients clearly shows that most of the variables are correlated highly with *CDR* both in 1971 and 1981; (3) it seems there would not be any significant difference if 1971 or 1981 measures of development are used with the 1981 *CBR* or *CDR;* they yield quite similar results. From Appendix Table 1 it is clear that except for one or two paths all the remaining paths in the models are significant.

The results of the numerical decomposition of effects on fertility for the years 1971 and 1981 and for the year 1981 with a lag of 10 years are shown in Table 2. It is seen that except for income, all the variables that influence fertility have path coefficients in the expected direction. The direct effect of income on fertility is positive but its indirect effect via *IMR* and *PCTCEP* is negative. This is true both for 1971 and 1981 analysis as well as for 1981 analysis with a lag.

TABLE 1—DECOMPOSITION OF ZERO-ORDER CORRELATIONS OF THE FERTILITY PATH MODELS (Given in Fig. 3) FOR THE YEARS OF 1971, 1981 AND FOR 1981 WITH A LAG OF TEN YEARS

Effect	*IMR LIT*	*IMR PRCPINC*	*PCTCEP IMR*	*PCTCEP LIT*	*PCTCEP PRCPINC*	*CBR PCTCEP*	*CBR IMR*	*CBR LIT*	*CBR PRCPINC*
					(1971)				
Zero order correllation	—57	—33	—44	61	54	—57	64	—66	—13
Causal direct	—54	—28	6	60	50	—39	44	—19	24
Causal Indirect	0	0	0	—3	- 1	0	-2	—45	—31
Causal total	—54	—28	6	57	49	—39	42	—64	—7
Non-causal	—3	—5	—50	4	5	—18	22	—2	—6
					(1981)				
Zero order correlation	—76	—37	—51	47	43	—60	81	—77	—27
Causal direct	—73	—30	—14	33	35	—23	47	—31	3
Causal Indirect	0	0	0	10	4	0	3	—44	—22
Causal total	—73	—30	—14	43	39	—23	50	—75	—19
Non-causal	—3	-7	-37	4	4	—37	31	—2	—8
					(1981 with a lag of 10 years)				
Zero order correlation	—57	—33	—44	61	54	—60	62	—74	—17
Causal direct	—54	-28	6	60	50	—27	30	-41	11
Causal Indirect	0	0	0	-3	—1	0	—2	—32	—21
Causal total	—54	—28	6	57	49	—27	28	—73	—10
Non-casual	—3	—5	-50	4	5	—33	34	—1	—7

Note. All coefficient values have been multiplied by 100.

The positive direct effect shows that the higher the per capita income, the larger the number of children born. The indirect effect of income is higher than its direct effect, indicating that income on the whole is contributing for the reduction in fertility. Income initiated decline in fertility indirectly through a reduction in infant mortality rate and an increase in the couples effectively protected.

In 1971, *IMR* has the strongest direct effect (.441) on fertility. It is followed by couples effectively protected (—.392), per capita income (.239), and adult literacy rate (—.188). However, adult literacy rate has the strongest indirect effect (—.452), followed by income (—.313) and infant mortality rate (—.023). Obviously, the indirect effect of couples effectively protected on fertility is nil. In the present fertility mode) as the couples effectively protected is considered as the most important variable, it is expected that its impact on fertility is only direct. When we consider the total causal effects, adult literacy rate (—.640) has the strongest total effect on fertility. It is followed by infant mortality rate (.418), couples effectively protected (—.392) and per capita income (—.074). For 1981, we find that the direct effect of infant mortalily rate on crude birth rate is the highest (.465) followed by that of adult literacy rate (—.314), couples effectively protected (—.226) and per capita income (.035). Again the indirect effect of adult literacy rate (—.434) is very high. It is followed by per capita income (—.224) and infant mortality rate (.031). In terms of total causal effects, adult literacy rate (—.748) has the highest causal effect followed by infant mortality rate (.496), couples effectively protected (-- .226) and per capita income (-.189).

When the lagged variables are used the direct effect of adult literacy on *CBR* of 1981 is highest, (i.e., —.412) followed by that of infant mortality rate (.302), couples effectively protected (—.268) and per capita income (.107). Adult literacy again has maximum indirect effect of —.316 followed by per capita income (—.214). Considering the total causal effects, adult literacy rate emerges as the most important factor to be followed by *IMR* and couples effectively protected.

The most striking points may be noted as below:

(1) There is no charge in the order of the importance of the variables that influence fertility over time. The order of the variables that influence fertility in both the years of 1971 and 1981 and when a lag of 10 years is considered, is Adult literacy rate, infant mortality rate, couples effectively protected and per capita income.

(2) The total net effect of per capita income on fertility seems to be negative, even though it is negligible.

(3) The total influence of infant mortality rate on fertility seems to be very high (next to the social development).

By implication, reduction in mortality, especially infant mortality by improving the social, economic and health conditions in various states in India, might make a significant dent in fertility. Even though, the total effect of family planning performance on fertility is impressive, its impact on fertility comes only next to that of variables of social and health development.

Table 3 shows the numerical decomposition of the zero-order correlations *for the effects of different socio-economic indicators on mortality in 1971 and* in 1981 both with and without a lag often years.

TABLE 3—DECOMPOSITION OF ZERO-ORDER CORRELATIONS OF THE MORTALITY PATH MODELS (Given in Fig. 4) FOR THE YEARS OF 1971, 1981 AND FOR 1981 WITH A LAG OF TEN YEARS

Effect	*IMR LIT*	*IMR PRCPINC*	*CBR IMR*	*CBR LIT*	*CBR PRCPINC*	*CDR CBR*	*CDR IMR*	*CDR LIT*	*CDR PRCPINC*
					(1971)				
Zero order correlation	—57	—33	64	—66	— 13	67	94	—62	—56
Causal direct	—54	—28	42	—42	4	9	70	—13	—31
Causal Indirect	0	0	0	—23	—11	0	4	—44	—20
Causal total	—54	—28	42	65	—7	9	74	—57	—51
Non-causal	—3	—5	22	-1	—6	58	20	—5	-5
					(1981)				
Zero order correlation	—76	*—37*	81	-77	—27	82	95	—76	—53
Causal direct	—73	—30	50	—39	—4	11	66	— 15	—24
Causal Indirect	0	0	0	—36	— 15	0	5	—56	-22
Causal total	—73	—30	50	—75	—19	11	71	—71	—46
Non-causal	—3	—7	31	—2	—8	71	24	- 5	—7
					(1981 with a lag of 10 years)				
Zero order correlation	—57	—33	64	—66	—13	76	86	—76	—51
Causal direct	*—54*	—28	*42*	*—42*	4	*23*	42	—34	—31
Causal Indirect	0	0	0	—23	—11	0	10	—38	—13
Causal total	—54	—28	42	—65	—7	23	52	—72	-44
Non-causal	—3	-5	22	-1	—6	54	34	—4	—7

Note. All coefficient values have been multiplied by 100.

Following points are worth noting :

(1) The dependent variable crude death rate in 1971 is affected in order of magnitude of the influence directly by infant mortality rate (.704), per capita income (—.310), adult literacy rate (—.131) and crude birth rate (.088); and indirectly by adult literacy rate (—.439), per capita income (—.200) and infant mortality rate (.037). When direct and indirect effects (total effects) are considered, Infant mortality rate seems to be *the* most dominant factor with its total causal effect of .741, followed by adult literacy rate (—.570), per capita income (—.510) and crude birth rate (088).

(2) Even for 1981, the same variables emerge as important variables in the order of their influence on mortality, i.e., crude death rate of 1981 is affected directly by infant mortality rate (.656), per capita income (—.243), adult literacy rate (—.154) and crude birth rate (.109); and indirectly by adult literacy rate (—.557), per capita income (—.215) and infant mortality rate (.054). When the total causal effects are considered, adult literacy rate emerges as the most important factor with its causal effect of—.711, followed by infant mortality rate (.710), per capita income (—.458) and crude birth rate (.109).

(3) When a lag of 10 years is considered, crude death rate in 1981 is affected, in order of magnitude of influence, directly by infant mortality rate (.421), adult literacy rate (—.340), per capita income (—.312) and crude birth rate (.227) and indirectly by adult literacy rate (—.377), per capita income (—.132) and infant mortality rate (.095). In terms of total causal effects, adult literacy rate (—.717), infant mortality rate (.516), per capita income (—.444) and crude birth rate (.227) are the most important predictors.

(4) In *1971, while* infant mortality rate is found to be the most important variable followed by adult literacy rate, per capita income and crude birth rate; in 1981, literacy rate preceds infant mortality rate, which is followed by per capita income and crude birth rate.

(5) The effect of crude birth rate on crude death rate seems to be negligible both in 1971 and 1981. The highest non-causal effect observed indicates that the path under consideration is unable to explain the effect of crude birth rate on the crude death rate.

It may be noted that infant mortality is used here as an indicator of health facilities and infrastructure available in the community and not as a measure of mortality.

Summary and Conclusions

The present paper attempts to find out the important determinants of fertility and mortality by considering two simple and different conceptual models for the years 1971 and 1981.

Over time, while there is no change in the order of the importance of the variables in the case of fertility, there is a little change in respect of mortality. However, in 1981 the social development and health development variables emerge as the most important set of variables that influence fertility and mortality respectively. In the light of this analysis, one may conclude that the social (literacy rate) and economic development (per capita income) along with *the basic* health *facilities* are the important *and* necessary *prerequisites for* the change in both fertility and mortality, in fact, if mortality declines, fertility might start declining in response to it. But both these demographic processes seem to be highly dependent in the fulfilment of basic norms of the social and economic development.

Undoubtedly, the variables selected for the study are small in number, nevertheless they broadly speak about the whole gamut of socio-economic and health indicators. Further, the analysis is based on areal units like states in the country and not all the states are homogeneous and comparable in reagard to their size and other factors which we assume to be unrelated to fertility. One should, however, view the findings only illustrative and not conclusive.

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APPENDIX

TABLE I—PATH COEFFICIENTS, STANDARD ERROR OF PATH COEFFICIENTS, MULTIPLE CORRELATION COEFFICIENTS AND THE PERCENT OF VARIATION EXPLAINED FOR THE VARIABLES USED IN THE PATH MODELS OF FERTILITY AND MORTALITY FOR THE YEARS OF 197], 1981 AND FOR 1981 WITH A LAG OF TEN YEARS

Fertility Models

	1971						*1981*						*19S1* (Lag)	
Intl. Var.	*IMR*		*PCTCEP*		*CBR*		*IMR*		*PCTCEP*		*CBR*		*CSR*	
Dep. Var.	*PATH.*	*S.E.*	*PATH.*	*S.E.*	*PATH.*	*S.E.*	*PATH.*	*S.E*	*PATH.*	*S.E.*	*PATH.*	*S.E.*	*PATH.*	*S.E*
PRCP1NC	- 28	25	4	11	—31*	6	—30*	16	—4	8	—24*	5	—31*	8
LIT	—54*	20	—42*	10	—13*	6	–73*	18	—39*	12	—15*	8	—34*	8
I MR			42*	14	70*	8			50*	14	66*	10	42*	10
PCTCEP					8	18					11	24	23*	23
M.C.C. (R^2)	63		74		9981				84		98		98	
P.V-E.	40		54		97		66		71		96		95	

Mortality Models

	1971						*1981*						*1981* (Lag)	
Ind. Var.	*IMR*		*CBR*		*CDR*		*IMR*		*CBR*		*CDR*		*COR*	
Dep. Var.	*PATH.*	*S.E.*	*PATH.*	*S.E.*	*PATH.*	*S.E.*	*PATH.*	*S.E.*	*PATH.*	*S.E.*	*PATH-*	*S.E.*	*PATH.*	*S.E.*
PRCPINC	— 28	25	50*	30	24*	14	—30*	16	35*	22	4	8	11	16
LIT	—54*	20	60*	27	— 19*	13	—73*	17	33	34	—31*	12	—41*	14
IMR			6	38	44*	14			—14	40	46*	14	30*	16
CBR					—39*	13					—23*	12	—27*	14
M.C.C. (R^2)	63		78		78		81		61		86		80	
P.V.E.	40		61		60		66		37		74		63	

PATH. : Path Coefficient; S. E. : Standard Error; M. C, C. : Multiple Correlation Coefficient;
P. V. E.: **Percent** Variation Explained; *:Significant—larger than 2 standard error.
Note. All coefficients have been Multiplied by 100-