Appendix

The problem of time lag in the development process, i.e. the time interval between the creation of development potential and capturing its impact on development finds place frequently in economic discussions. The impact of human resource development and creation of infrastructure facilities on economic development is also expected to be beset with the problem of time-lag. In other words, the hypothesis that a time gap exists in between the development of human resource and creation of infrastructure facilities, and their impact on economic development is not unreasonable to hold. However, the length of lag period may not be uniform with respect to different causative variables of development. In this short appendix, an attempt is made to account for the lead-lag problem arising out of the development of human resource and creation of infrastructure facilities on the one hand, and their effects on economic development on the other. However, the appendix will be silent over duration of time-lag.

Lead-lag problem has been examined with the help of correlation analysis. In doing so, the development index and each of its indicators in the terminal year are correlated with human resource development index and each of its indicators, and infrastructure index and each of its indicators in the initial year; and the correlation coefficients are presented in matrix form in Appendix Table II-1 and Appendix Table II-2.

It can be seen from Appendix Table IL-1 and Table IL-12 that the calculated correlation coefficients of development index of 1981 with human resource development index and each of its indicators in 1971 are higher than those of development index with human resource development index and each of its indicators in 1971 with expected signs. This indicates that human resource development appears to be more effective in the process of development in the region with a time lag. Strikingly, the impact of student enrolment in 1971 on the level of economic development of 1981 is found to be significant (Appendix Table IL-1) while its impact on the level of development of 1971 is not significant (Table-IL-12). Furthermore, the tables show that the coefficients of correlation of human resource development index and each of its indicators in 1971 separately with each of the indicators of development of 1981 in most of the cases are greater than those between human resource development index and each of its indicators on the one hand and each of the indicators of development on the other in 1971. The relationship of each of human resource development index, literacy and student enrolment in 1971 with non agricultural workers in 1981 are found to be significant, while their correlation coefficients were not significant in 1971.

1	2	3	4	5	6
1.	Infrastructure Index	.67**	.71**	.48	.31
2.	Road length per 100 sq. km. of area.	.56*	.62*	.47	.11
3.	Road length per lakh population.	.27	-.04	.26	.18
4.	Villages electrified	.66**	.92*	.76**	-.09
5.	Irrigation	.89	.15	-.11	.74.**
6.	Post offices per lakh population.	-.14	-.22	-.29	.83
7.	Post offices per 100 sq.km. of area.	-.02	.09	-.14	-.10
8.	Bank offices per lakh population.	.70**	.71 **	.89**	-.19
9.	Bank offices per 1000 sq. km of area.	.46	.54 *	.27	.06
10.	Vertefumry Institutions per 1000 sq. km. of area	-.09	-.10	-.28	.14
11.	Buses registered per lakh population.	.14	.30	-.04	.47
12.	Broadcasting receiver licenses per lakh population.	.86**	.81 **	.95**	-.02

N.B.:- Prepared on the basis of T = II-7, II-8,

2	3	4	5	6	7	8
1. Infrastructure Index	.67++	.71++	.48	.31	-.42	.4
2. Road length per 100 sq. Km. of area.	.56+	.62+	.47	.11	-.55+	.5
3. Road length per lakh population.	.27	-.04	.26	.18	.42	-.
4. Villages electrified	.66++	.92+	.76++	-.09	-.71++	.08
5. Irrigation	.89	.15	-.11	.74.++	-.05	.?
6. Post offices per lakh population.	-.14	-.22	-.29	.83	.48	-.
7. Post offices per 100 sq.km. of area.	-.02	.09	-.14	-.10	-.11	.44
8. Bank offices per lakh population.	.70++	.71 ++	.89++	-.19	-.38	-.
9. Bank offices per 1000 sq. Km of area.	.46	.54 +	.27	.06	-.23	.62
10. Vertefnary Institutions per 1000 sq. Km. of area	-.09	-.10	-.28	.14	-.18	.70
11. Buses registered per lakh population.	.14	.30	-.04	.47	-.32	.33
12. Broadcasting receiver licences per lakh population.	.86++	.81 ++	.95++	-.02	-.49	-.

N.B.:- Prepared on the basis of Tables II-7, II-8, II-10, and II-14.

Appendix Table II-2 presents correlation between infrastructure index and each of its indicators for 1971 on the one hand and development index and each of its indicators for 1981 on the other in a matrix form. Comparing the correlation coefficients presented in the above table with those between infrastructure index and each of its indicators, and development index and each of its indicators in 1971 presented in Table II-13, one may have the following observations as given below. The correlation coefficients of infrastructure index and each of its indicators in 1971 with development index of 1981 have shown, in general definite improvement with expected signs. Thus, the problem of time-lag in the creation of infrastructure facilities and capturing their impact on development process appears to have important bearing. The tables indicate that the impact of road length (in terms of area) on the level of development becomes positive and significant after an interval of time(Appendix Table II-2) while its impact on development in 1971 was not significant (Table II-13). Similarly, one can see from the tables that in most of the cases there is positive improvement of correlation of infrastructure index and each of its indicators with each of indicators of development in 1981 (when compared with their correlation in 1971).

However, in most of the cases, the coefficients are non-significant.

Thus, one may conclude, in general, from the above analysis that the influence of time-lag on the forcess of development in the region cannot ordinarily be dispensed with. If development in the region is to be speeded up efforts should be made to minimize the influence of time-lag on development.