CHAPTER II

A THEORETICAL BACKGROUND

II.1 Introduction:

In this chapter we attempt to provide a theoretical framework to the present study. In section II.2, the role of agriculture in economic development is discussed. Section II.3 deals with the various factors impeding agricultural development. In section II.4 we have discussed the need for agricultural infrastructure in agricultural development and in section II.5 the conclusion is given.

II.2 Agriculture and Economic Development:

Economic growth and development are today the goals of nations all over the earth, those long industrialized as well as those called underdeveloped.

This goal in its train has brought programmes and policies for the sectoral development of the economy. The basic problem of economics is the allocation of scarce resources among unlimited wants. The underdeveloped economies characterized by scarce resources, are

also confronted with such a dilemma of innumerable wants which entails them to isolate priority sectors on the basis of their relative importance in the ultimate objective of economic development. As such it has become a point of debate for a long time among economists whether development should precede in agriculture or in industry. Strong arguments both for the precedence of agricultural development and against have been put forward. But "there is now pretty wide consensus that the extremists on both sides of this debate were wrong, and that the complementarities between agriculture and industry are so pervasive that except in very unusual cases neither sector can progress without substantial growth in the other."  

However, in the initial stages of development, the agricultural sector yields such an influence on the economy that we are forced to take it to be the whole


economy. Hence, historical experience shows that moves of change first occurred in agriculture (as there was no other sector worth calling the name) and then followed to other sectors. Nevertheless, certain aspects of agriculture's role appeared to have a high degree of generality because of special features that characterise the agricultural sector during the course of development. These have made many to write on the problem of development in terms of "economic development" or "agricultural development" as if the two were mutually exclusive.

In this context it would be worthwhile to discuss the potential contribution of agriculture to development. The transformation of the economy from a predominant agricultural sector to a growing modern industrial sector is a symptom of economic development. In this process, agriculture declines relatively because:

Increased specialization in production transfers many non-agricultural production jobs from the farm households to urban centres, there is relatively low income elasticities of demand for agricultural commodities as compared to non-agricultural commodities in an environment of rising incomes, increasing transport cost of agricultural and non-agricultural commodities

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pose serious threat to extreme specialization in agricultural production; and the inconsistency of normal input-output relationship in a high productivity, high-income agriculture with the existing population density of many presently low-income parts of the world.5

The agricultural and non-agricultural sectors are tied up with each other and they frequently interact in the process of economic transformation. Prof. Nicholls argues that in a 'closed economy', the most important precondition of industrial expansion is the achievement of a rate of increase in agricultural productivity which exceeds the concurrent rate of increase in the demand for food.6 An increased productivity of agriculture will permit agriculture to release part of its labour force for industrial employment while meeting the increasing food needs of the non-agricultural sector,7 raise agricultural income, thereby creating the rural purchasing power needed


to buy the raw industrial goods and rural savings which
may then be mobilized, by direct or indirect means, to
finance industrial development, enable agriculture to
supply the major wage-goods (food) of industrial workers
at prices favourable to the profitability of new
industry.

Prof. Nicholls further says that with the
introduction of industrial trade, the contribution of
agriculture declines because, nations find it economical
to import some of their food needs due to the comparative
advantage they may have in non-food production which
they will export in exchange of food. For instance, the
demand abroad of the industrial crops (like cotton, jute,
rubber), of minerals, or even of manufactures would be
sufficiently large to support substantial export and
even to attract foreign capital and entrepreneurial talents
needed to develop such export industries. In this case
also, it is interesting to note that a rising productivity
is most welcome due to its potentiality as a saver of
scarce foreign exchange and balancer of the cash crop-food
crop agricultural economy. Again a sufficiently high
productivity in the food sector would enable a country

8. Lewis W.A., Theory of Economic Growth, Allen and Unwin,
London 1955, p. 334

9. Prof. Nicholls prefers to call the existance of planta-
tion and peasant farming as the 'dualistic agricultural
economy' W.H. Nicholls, op. cit. p.12.
to export its food surplus on favourable terms (the country then may find comparative advantage in food itself) which would contribute to the domestic industrialization through its effects on balance of payments.

Prof. J.W. Mellor feels that the central task of agricultural development is the mobilization and more efficient use of land, labour, and other resources already available to agriculture. He says that this has the double obligation to increase production and to provide capital for other sectors in order to promote economic growth, while at the same time it must still provide for the welfare of farmers and their families.  

Inadequate nutrition is a burning problem of many countries characterized by underdevelopment. This nutritional shortages tell upon the economic productivity very badly. Consequently agriculture has a significant role to play in improving the nutritional values, for which there must be first of all a quantitative increase in the production which would later lead to qualitative betterment.

Agricultural sector being so important in an economy, the sluggishness in its development will hit hard the general economic growth and all the more the

11. "H. Leibenstein, Myrdal and the F.A.O. to name a few have all remarked that productivity decreases when workers do not eat adequately." Pedro Bally, 'Economic
process of industrialization itself. In an analysis of the relative growth rates in Agriculture and Industry, Prof. Ashok Rudra states the effects of a relatively slowly developing agriculture on industrial development as under:

"Under ceteris paribus conditions,

1. Shortage of agricultural raw materials for domestic industries would tend to slow down the growth of industries dependent on such raw materials.

2. Shortage of agricultural products for exports would reduce foreign exchange earnings and thus reduce import of capital goods and industrial raw materials, both of which would in turn tend to slow down industrial growth.

3. Shortage of food grains, other food products and consumer goods primarily based on agriculture would cause their prices to rise; this would tend to raise wages which in its turn would apply an upward pressure on the general level of prices.

4. If the shortages are to be met by imports, there would have to be cuts in the imports of industrial raw materials and capital goods, leading to a slowing down of industrial growth, same as in case 2 above.

(Continued from page 13)

5. If the general price level is attempted to be pegged up by appropriately increasing the volume of direct taxes, the distortion in the relative price structure would cause an absolute fall in the level of prices of industrial consumer goods. This in turn would tend to reduce investment in the industries producing them and slow down the growth of industries in general.\(^{12}\)

The significant role of agriculture in general economic development and its dominance in many under-developed countries call for needed attention on agricultural development. But many of these countries possess a traditional agriculture with sluggish growth rate in the sector. So the major impediments to rapid rates of advance should be isolated in order to accelerate agricultural development.

II.3 Limiting factors of Agricultural Development

The problems of agricultural development and the development of the economy as whole are very much related. Hence in a theoretical discussion of the 'Shocks' and 'Growth depressants' of agricultural sector, the views of writers on the problems of economic development too should

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find place, apart from the ideas of agricultural economists.

Thus Prof. Leibenstein\(^{13}\) lists the characteristics of a backward country under four main headings vis. Economic, Demographic and health, Technological, and Cultural and Political which act as brakes to faster growth rate in the agricultural sector as well as the economy in general. He says that the 'absolute over-population' in agriculture renders the marginal productivity of labour zero.\(^{14}\) Further there is only little capital per head available. As a consequence to the low income per capita, the existence is near the "Subsistence" level and practically only zero savings for the large mass of people.

The small size of holdings and the exceedingly small plots make an uneconomic use of the already low capitalization on the land. Poor credit, marketing and


14. Lewis, Kuznets, Murkse, among others, also argue that the marginal productivity of labour in agriculture is either zero or negative and hence a withdrawal of labour from agriculture will increase the marginal productivity. But Prof. Gunnar Myrdal (Asian Drama, Vol.III Chap. 26, Agricultural Policy, p.1255) is convinced that a labour withdrawal from agriculture will tantamount to a reduction of agricultural productivity and hence he pleads for further intensive labour utilization in agriculture to increase productivity.
transport facilities jeopardise modernized agricultural production for sale and there exists the absence of an efficient demand in the local market. The inability of the small land holders and peasants to weather even a short-term crisis forces them to get the highest possible from the soil which leads to soil depletion.

Demographically, the inadequate nutrition, dietary deficiencies, rudimentary hygiene and public health tell upon the productivity of the labour. Culturally, the low education, high degree of illiteracy and the traditionally determined behaviour of the people are not conducive to the establishment of a modern agriculture. Again, inadequate training for the agricultural personnel in the use of modern implements still nurture a crude and obsolete technology which hampers agricultural development.

Emphasising the need for agricultural development, as the growth of industrial production presupposes growth of agricultural production, Prof. Kaldor says that the actual rate of progress is constrained by the maximum attainable flow of ideas.

16. Kaldor, M., ibid, p.237
Prof. Viner gives his own 'artificial' but logical obstacles to development as low productivity functions scarcity of capital, conditions of foreign trade, and rapid rate of increase of population.\textsuperscript{17}

According to a U.N. Committee, among other factors, the low state of nutrition of the agricultural population also is an important limiting factor of agricultural development in underdeveloped countries.\textsuperscript{18}

Discussing the major obstacles to development Prof. G.M. Meir\textsuperscript{19} also subscribes to the view of Prof. Nurkse\textsuperscript{20} when he writes that economic progress is

\begin{itemize}
\item \textsuperscript{17} Viner, Jacob 'Economic Development' in "Economics of Underdevelopment" ed. A.N. Agarwala and S.P. Singh, Oxford University Press, New York, 1963. pp.17-30
\item \textsuperscript{18} Ester Boserup argues that agricultural growth takes place consequent on the high pressure of population and as such she considers population as a favourable factor for agricultural growth rather than obstacle. "Conditions for agricultural Growth", G.Allen and Unwin, London, 1965. In a comparative study of various nations, Prof. Colin Clark has revealed that pressure of population does not impede agricultural production. 'Population and Living Standards' in Agarwala and Singh, ibid. pp. 36-38.
\item \textsuperscript{19} Meir, Gerald M. 'The Problem of limited Economic Development in Agarwala and Singh, ibid. pp.60-61.
\item \textsuperscript{20} Nurkse, Ragnar, 'Problems of Capital formation in Underdeveloped countries', Oxford University Press, Bombay, 1962, p.2. also Nurkse, R. 'Some international aspects of the problem of economic development' in Agarwala and Singh ibid. p. 269.
\end{itemize}
trapped in the "Vicious Circle". Thus they go on to argue that a "country is poor because it is poor". Meir opines that the labour supply was inefficient and although employment per unit of output was high, labour supply curves were frequently back-ward sloping and surplus population on land takes the form of disguised unemployment. Feudal system of land tenure and production for narrow village markets also kept productivity low. This resulted in a large proportion of labour to produce a small surplus above subsistence needs.21 Another important point in Prof. Meir's discussion is the market imperfections. Due to market imperfections the actual production does not exceed or come up to maximum possible production level even with optimum allocation of resources. These imperfections are: imperfect knowledge—i.e. ignorance of potential resources and ignorance of techniques, ignorance of domestic and world market conditions, imperfect mobility, specificity of factors, and imperfect divisibility of factors.

To step up output, there must first be many 'once-over' structural changes, plus a great deal of 'lump investments' spread simultaneously over a broad front so that the utilisation of the investments will approach full capacity.22

21. Meir O.M. p.'61; in... Agarwala & Singh op.cit.
Unbalanced socio-economic structure and even the differences in the nation's propensities are also very important factors to Prof. W.W. Rostow, which shackles economic progress.\textsuperscript{23}

In their attempt to provide a theory of agricultural development Johnston and Mellor\textsuperscript{24} have given three stages of agricultural development. In the first stage there is the development of agricultural pre-conditions. Improvements in land tenures are likely to be the most essential requirements in this phase since an unfavourable tenure situation may stifle the incentive for change even though the potential exists for large increase in output. Rural attitudes toward change are also influenced by the attractiveness and availability of market outlets, consumer goods, awareness of the possibility of technical improvements and many other factors. If traditional group restraints and individual attitudes hostile to change seriously impede agricultural progress, considerable importance may be


attached to community development programmes emphasizing adult literacy, self-help programmes directed at the satisfaction of self-needs, and similar activities that promise greater receptivity to change. But certainly these are situations in which deficiencies in the institutional environment or attitudes unfavourable to change are critical limiting factors and in any event, continuing improvements in institution and incentives can be expected to facilitate agricultural progress.

In the second phase, emphasis is laid on increasing the efficiency of an existing agriculture by heavy reliance on technical innovations associated with labour-intensive and capital saving techniques. Certain distinguishing features of this stage of development are that the agriculture represents a large proportion of the economy, the demand for agricultural products is increasing substantially, but the 'required' increase in output of food for domestic consumption is fixed within fairly narrow limits determined by the rate of increase of population and of per capita incomes, the capital for the expanding industrial sector is particularly scarce, and the distinction between resources of high opportunity cost and those which are abundant in agriculture and
characterised by low opportunity cost is of considerable importance.

The third stage distinguishes itself with an expansion of agricultural production based on capital intensive labour saving techniques.

But water-tight division into three phases seems to be difficult in many of the underdeveloped countries because an overlapping of the characteristics of these different stages are present. Even when the pre-conditions of the first phase like the implementation of land reforms are yet to be properly satisfied efforts for improved agricultural efficiency through labor-intensive techniques, which is an objective of the second phase, are made because of wide spread unemployment and of the pressure of population. While some of the sub-sectors of agriculture like plantation etc. witness heavy capital-intensive techniques, the majority of the sector is still traditional. This dualism exists side by side in some of the underdeveloped countries. Further in the final phase itself according to Johnston and Mellow, "there are probably relatively few underdeveloped areas where agricultural policies should be based on the assumption that the pre-condition phase prevails."

25. Spiegelglas, S. and Welsh C.J. op.cit. p.192
The vicious circle presents low income in succession to low production. The following factors have been held responsible specifically for the presence of low income in agriculture by Prof. Ugo Papi.26

Ecological factors making difficult to introduce modern methods of production and farm management like dry climate, deficient water supply or the prevalence of mountains or marginal hill land, marked disproportion of factors of production, the expulsion of a large part of the population from the circular flow of production and marketing, and the ineffective organisation of farm workers.

Thus there are umpteen factors that come in the way of agricultural development as stumbling blocks. This multiplicity of factors put the practitioners or policy makers in the bewildering task of isolating the crucial factors which need serious and immediate attention.27


27. In this context it would be interesting to quote Prof. Kenneth Boulding:

"O why does agriculture lag?
The answers all are in the bag
But the bag in which the answer lies
Turns out to have enormous size."

Millikan M.F. and Hapgood, D, op. cit.
Thus "increasing the productivity of agriculture in the underdeveloped countries is a complicated task. Indeed, in some countries it seems like an almost impossible one. There are so many things to be done that those attempting to attack the problem hardly know where to begin."28 When researchers look at the problem through some particular angle, the conclusions emerging there from would seem to be most crucial, even though it would be admitted that factors outside their model will also pose problems of serious dimensions.29

Even though agricultural situation in different regions varies and there exists a diversity in its requirements, there can still be some common features everywhere which make it easy to find a satisfactory classification or checklist of the principal factors affecting agricultural development. A systematic

28. Robert J. Alexander, op.cit. p. 77

29. Millikan and Hapgood states that in a Conference held at M.I.T's Centre for International Studies in 1963, specialists from various disciplines put their heads together to thrash out the outstanding problems of agricultural development in a developing economy. After conducting quite a number of interviews with the specialists, it had become clear that each specialist would find that the factor familiar to him was crucial in a given situation, though he might also acknowledge the role of factors in fields other than his own. The resulting prescription would then be: "Do something about my factor first - and the others will follow." Millikan and Hapgood, op.cit. p. v
classification will enable the diagnosis and policy prescription easier in the complex situation of multiplicity of factors. Millikan and Hapgood have presented a table classifying the factors affecting agricultural production. But, of course, a compact classification would be impossible as many of the factors are interdependent and mutually interacting. However, they divide the factors affecting agricultural development into five major categories—Physical input factors, Economic factors, Organizational factors, Cultural and motivational factors, and Knowledge factors—each of which is further divided into a series of sub-categories.

Writing strictly on the Indian agricultural situation, Prof. A.M. Khusro has tried to analyse and establish theoretically the following hypotheses in which some of the very important factors pulling back agricultural growth have been comprehended. Thus he writes: "Indian agricultural growth has been slow owing to:

a failure to understand the operation of the price mechanism and hence to price output and input appropriately; a failure to direct investment in relatively

more productive channels; a failure to adopt relatively more profitable cropping patterns; a failure to analyse the implications of land reforms under a free price system and follow up these implications and a failure to utilize (organize) agricultural labour surplus and other forms of agricultural savings for capital formation.\textsuperscript{31} 

In underdeveloped countries, where agriculture has surpassed the primitive stage of subsistence agriculture and embarked on the adoption of modern technology, another important factor, whose absence may act as 'depressant' to growth is the incentive factor. Incentives provide a base to the economic behaviour of the farmers who are the backbones of agricultural development. When farmers find that the risk they are taking in agricultural enterprise is going to provide them with good dividends, they would be induced to take such decision as the use of modern technology for higher production. These incentives can in one way be provided by adequate and efficient infrastructural facilities.

In this context Dr. J.C. Abbot rightly remarks: "while adequate incentives at the farm level will not guarantee that all farmers will make the additional effort needed to increase production, their absence will certainly mean that such efforts are unlikely to be made."32 Hence it becomes imperative that there be adequate investment in the agricultural infrastructure so as to provide necessary incentive to the farmers to increase production. Adequacy in infrastructure should not only mean a high proportion of the investment in the overhead facilities of agriculture, but it should also mean an efficient functioning so that it delivers goods. In the succeeding section, it is attempted to build up a case for agricultural infrastructure for agricultural development.

II.4 Need for Infrastructure in Agricultural Development:

As has been mentioned earlier, agricultural progress depends upon the economizing behaviour of the people connected with agriculture. But this economizing behaviour per se is not an independent factor. In 1965 Clifton R. Wharton wrote that the economizing behaviour

in turn is a function of the economizing setting consisting of physical, climatic, socio-cultural, and institutional factors. 33 'Economizing setting' which provides a base to the 'economic behaviour' of the farmers forms the infrastructure for agricultural development.

The need for investment in infrastructure for economic growth has been accepted widely. Albeit reference to infrastructure has been made long ago, there does not seem much semantic consensus on the term infrastructure. Quite often 'social overhead capital' and 'infrastructure' mean the same 'basic requisites' for development and as such several experts use the terms interchangeably.

Although, economists use this concept frequently, surprisingly very few of them name it infrastructure. 34 Similar aspects have been included


34. The term infrastructure originated as a military term for the invasion of France during World War II and was applied to such items as oil pipe lines; which was later broadened to use various other items. It was used in place of 'Social overhead capital' in the early days of Marshall Plan, after World War II to avoid confusion with hospitals, schools and
in the content of the term by several economists, with some variations. Thus as early as 1844, Jules Dupuit\textsuperscript{35} threw up the idea of the social desirability of investment in such public utilities as canals, roads, bridges and railways for the benefits derived by the uses of these public utilities. Prof. Lewis\textsuperscript{36} and Prof. Higgins\textsuperscript{37} have added schools, hospitals, water supplies and electricity to the list. While they have not used the specific term infrastructure, Prof. Harry O. Johnson\textsuperscript{38} mentions the term and includes similar items. Prof. Hirschman\textsuperscript{39} clearly (Continued from page 28)

and similar welfare-type facilities. Personal communication from Prof. Rosenstien-Rodan to Dr. Wharton quoted by C.R. Wharton, 'The infrastructure for Agricultural Growth' in Southworth and Johnston, \textit{op.cit.} p.110


36. Lewis, W.A. \textit{op.cit.} p.394


distinguishes the Social Overhead Capital and the 
Directly Productive Activities. He says that Social 
Overhead Capital is usually defined as comprising 
of those 'basic services' without which primary, 
secondary and tertiary productive services can not 
function. He further writes: "in a wider sense, it 
includes all public services from law and order 
through education and public health to transportation, 
communication, power and water supply, as well as 
agricultural overhead capital as irrigation and 
drainage system."\(^{40}\) Again he limits it to a narrower 
boundary to include only transportation and power 
which he calls the 'hard core.' According to Kamarek, 
infrastructure can be defined as "the basic services, 
or public utilities, which are necessary to the 
commodity producing sectors of the economy."\(^{41}\) This 
definition seems to be too vague to be taken for 
any analytical purpose, especially in the case of 
agriculture. There are many institutions and services 
which are not directly necessary to the commodity

\(^{40}\) Hirschman, A.O., *op: cit* p.83

\(^{41}\) Kamarck, A.M. "The Development of Economic Infra-
structure" in M.J. Herskovits and M. Haraitz ed. 
Economic Transition in Africa, 1964, p.263
producing sectors, but whose absence may have serious repurcussions on the overall performance of the sector.

Hirschman\(^{42}\) provides much more clarity when he demarcates between the 'Directly Productive Activities' and the 'Social Overhead Capital.' He states: "the conditions for including an activity under the category of SOC are probably at least the following:

1. The services provided by the activity facilitate, or are in some sense basic to, the carrying on of a great variety of economic activities,

2. The services are provided in practically all countries by public agencies or by private agencies subject to some public control: they are provided free of charge or at rates regulated by public agencies,

3. The services can not be imported."

He further adds that the differences between the wide and the narrow meaning of SOC depends on whether one adds a fourth condition, viz.

4. "The investment needed to provide the services is characterised by lumpiness (technical indivisibilities) as well as by a high capital-output ratio (provided the output is at all measurable)." At this point he specifies that the fourth condition focusses attention away from,

say, health and education, toward port installations, high ways, hydro electric projects etc.

In spite of the fact that economists have tried to define infrastructure and defend it in the context of development, very few attempts have been made by agricultural economists to conceptualize agricultural infrastructure for agricultural growth. In 1960, De Vries listed transport, communications, power, health services, education, water supply and housing as basic to agricultural development. To quote Prof. Nicholls, "at a minimum, goverment will, probably, be called upon to assume the role of assuring an optimum rate of direct or indirect public investment in transportation, education, agricultural research and extension services, banking and credit institutions and other types of social overheads." It is Dr. C.R. Wharton who has put in considerable effort in this field and has made a scientific theoretical analysis. He has conceptualised 'infrastructure' in the light of an agricultural


economy and has given a precise definition which is broader and more accommodative than the earlier definitions cited. Thus he defines agricultural infrastructure as follows: 45

"The physical capital and the institutions or organizations both public and private, which provide economic services to and have a significant effect, directly or indirectly, upon the economic functioning of the individual farm firm, but which are external to the separate, individual farm firm."

Wharton arbitrarily divides the agricultural infrastructure into two major types: Capital-intensive and Capital-extensive. Capital-intensive are those which heavily involve reproducible capital for the provisions of the service, such as roads, bridges, warehouses, or dams. This category to Wharton, comes closest to the usual notions of social overhead capital. Also included are the organizations and institutions which maintain and operate the capital infrastructure facilities such as marketing firms to transport farm products or co-operatives to store and to process crops. Capital extensive or service

infrastructure are those in which the capital component is negligible, such as extension education, conservation schemes, agencies for plant and animal protection, and disease and pest control organizations. While he includes these in infrastructure, the firms which produce them are excluded from the scope of the term.

Given the agricultural infrastructure, we would proceed next to examine how it helps agricultural development. The two facets of infrastructure, which magnify its importance are the 'Sociality' and the 'Externality'. The infrastructure is social because it is available to or affects larger social entities, rather than individuals privately. This sociality of infrastructure helps individual in two ways:

1. The cost of establishing the infrastructure is socially shared and hence far less costly than it would have been, had it been ventured by individual.

2. Even the social cost can be minimized and the social benefit maximised, thus leading to individual benefit, due to the working of economies of scale.

46. In the case of agriculture, the individual unit is the farm firm. Wharton says that there is a fairly universal conceptual notion of the farm firm as an integrated unit of production subject to the decision-making control of one individual or some centralised group of individuals.
as it is on a large scale for the society. The high
cost involved in the construction of 'overheads' and
the 'infrastructures' and the 'lumpiness' and the
resultant inefficiency of individual in its operation
also suggest that such investments be social or public. 47
Thus Henry C. Wallich accepts expenditures on 'Social
Overheads', when he says that "in a development process
carried forward by broad popular demand, a considerable
part of total investment is likely to be in 'Social
Overhead'. This can only be undertaken by a government. 48
Scitovsky states that society provides social services
through communal action and makes them available free
of charge to all persons and firms. 49 Even though
sociality of infrastructure is an inevitable con­
comitant of the very nature of it, much of the justi­
fication for infrastructure in the development process
emanates from the externality of it.

47. This does not deny the historical fact that in
western Europe, for example, long before
industrialization, the govt; the military, parish
authorities and private trusts invested consider­
able resources in canals, roads, turnpikes and
other public works that provided overhead
facilities. Mason E.S., "Economic Planning in
Underdeveloped Areas", Fordhan University Press,
48. Henry C. Wallich, 'A Theory of derived development',
in Agarwala and Singh, op. cit. p.201
49. Tiber Scitovsky, in Agarwala and Singh,op.cit p.297
The externality of infrastructure takes us back to the whole discussion of 'External Economies' as introduced to the science of economics as early as 1890 by Prof. Alfred Marshall. Dividing the economies arising out of an increase in the scale of production of any kind of goods into two, he names those dependent on the general development of the industry as 'external economies'. Marshall says that the situation of a business nearly always plays a great part in determining the extent to which it can avail itself of external economies. To quote him: "If in any industry whether agricultural or not, two producers have equal facilities in all respects, except that one has a more convenient situation than the other, and can buy or sell in the same markets with less cost of carriage, the differential advantage which his situation gives him is the aggregate of the excess changes for cost of carriage to which his rival is put".  


51. Ibid p. 441
External economies arise whenever the output \((X_1)\), of a firm depends not only on the factors of production \((l_1, c_1\ldots)\) utilised by this firm but also on the output \((X_2)\) and factor utilization \((l_2, c_2\ldots)\) of another firm or group of firms. In symbols,

\[
X_1 = f (l_1, c_1, \ldots; X_2, l_2, c_2, \ldots)
\]

where the existence of the external economies is indicated by the presence of the variable to the right of Semicolon.\(^52\) Jacob Viner prefers to call this 'technological external economies' as it is a peculiarity of the production function.\(^53\) According to Rosenstein-Rodan,\(^54\) external economies function as a result of the interdependence of various industries on the one hand and on the other various firms within one industry. Scitovsky\(^55\) enumerates four types of direct (i.e. non-market) interdependence. But his illustration of the fifth one, is the case where the results of Government sponsored research into industrial and agricultural methods are made gratuitously available.

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53. Jacob Viner, 'Cost curves and Supply Curves', quoted by Scitovsky op. cit. 297

54. Rosenstein-Rodan, 'Problem of industrialization in Eastern and South-Eastern Europe', in Agarwala and Singh, op. cit. p. 250

55. Scitovsky, op. cit. p. 298.
to industrialists and farmers.

Economic progress goes with increasing returns and increasing returns can be achieved by external economies. Allyn Young writing in the Economic Journal stated that as the economic overheads increase, cost of production for certain industries declines and this reduction in cost is transmitted to other industries, as all industries are related.\(^56\) Interpreting Adam Smith's view of division of labour, A.A. Young argues that increasing returns depend upon the progressive division of labour, and the "principal economies of the division of labour, in modern firms are the economies which are to be had by using labour in round about or indirect ways."\(^57\) Division of labour among various industries and resultant cheap transport, nearness to larger population, nearness to the source of supply of raw materials or cheap power give advantages to industry and increase its returns. Thus investment in 'Social Overheads' or 'infrastructure' not only brings profits from among themselves, but also increases the profit of other industries. Further it reduces the cost of other industries.


\(^57\) ibid, p. 539
and thus provides incentives for increased production through higher profits. Rosenstein-Rodan says that in the absence of external economies, there is no incentive within their framework for many investments, which are profitable in terms of 'Social marginal net product.' Paul A. Baran emphasizes this point when he opines that the absence of external economies because of the inadequacy of the economic milieu in underdeveloped countries, constitute an important deterrent to investment, and so roads, electric power stations, rail roads, and houses have to be built before business men find it profitable to invest their funds in new industrial enterprises. Paul Streeten agrees that external economies bring cost reduction. But he goes on to argue that: "although the need for large fixed investment in social overhead equipment and its slow rate of obsolescence would suggest that it should always be used as the spearhead (for Unbalances), other considerations point to different answers." However, economists widely accept that there exist a relation between infrastructure and

external economies.

But the specific relation between the two, especially in the case of agriculture has received only limited attention. In fact, agricultural infrastructure affects the basic economic function of production, marketing and consumption in a variety of ways. The development of marketing accompanies the movement towards specialization, division of labour, monetization of production and purchase of inputs, all of which are characteristics of advanced agricultural economies. A favourable change in infrastructure constitutes a downward shift in the cost curves of the firm or industry in the same fashion as an improvement in technology. Some infrastructural changes affect solely the cost side such as improved roads and transport facilities which reduce transport losses and factor input costs at the farm gate. Others may affect the shape and position of the production function, some directly,

such as research that produces new higher yielding
varieties that alter the production surface; others
indirectly, such as improved crop protection programmes
that increase the effective harvest reduce storage
losses and the like and consequently alter the
levels of effective market supply and finally returns.

Rosenstein-Rodan's arguments regarding the
dynamic interdependence of investment decisions have
been strengthened by Chenery when he explicitly and
specifically included consideration of a limited
number of infrastructure. Chenery also points out
that there is interconnectedness in productive
sectors, which leads to investment in one making
investment in others more profitable. To him the
external economies which occur in the industrial
sectors provide the justification for investment in
'Social Overhead' facilities and in much of primary
production. Some of the empirical studies by experts
like Griliches, Nelson and Tang tried to explain

61. Chenery, H.B., "The interdependence of investment
decisions" in Abramovitz, M et al. 'The allocation
of Economic Resources' Stanford, 1959, p.87.
62. Griliches, Z. "Research Expenditures, education and
the aggregate agricultural production function," The
63. Richard, L. Nelson, "The Simple Economic basis of
Scientific Research" Journal of Political Economy,
June 1959, also Nelson, R.L. "Aggregate Production
Function and medium range growth projections,
64. Anthony M. Tang, "Research and Education in Japanese
Agricultural Development 1880-1938" Economic Studies
the residual in output-input ratios as a result of investment in infrastructure. In an analysis of 1949 data for 68 regions of the U.S., Zvi Griliches has introduced a new variable, "public investment in research and extension" and found to be both 'significant' and important as a source of aggregate output growth. 65

While the above studies have focussed their attention on education, extension and research, logically it would follow that other components of infrastructure can also be equally considered. The validity of the case for infrastructure is so much so that Griliches included some of the Social Overhead Capital into inputs and calls it "external inputs." He writes: "the main candidates for addition to the conventional list of inputs are research and development capital, education of the labour force, and "external" inputs such as research and extension activities of the government, and other firms, and other non-market priced services such as the provision of transportation and communication facilities." 66


In his phase II of agricultural development, Mellor feels that the first requirement of a development programme is the specific identification of scarce resources so that means can be established for enlarging their supply. Policies to provide motivation, research to develop improved production facilities, production facilities for new and improved forms of physical inputs, systems to service agricultural production, and education to help farmers make better-informed choices are included in his scarce resources. 67

It is interesting that many of these are components of an agricultural infrastructure, though Mellor calls it scarce resources. In an earlier article Rosenstein-Rodan wrote that national and international investments should concentrate at the start on building 'basic industries' and public utilities which give rise to new investment opportunities. He adds: "let us build railways, roads, canals, hydro-electric power stations, the rest will follow automatically." 68

Perhaps the discussion of infrastructure may drag in the controversy of balanced and unbalanced growth. Starting with Frederic List, later A.A. Young, Rosenstein-Rodan, Nurkse and Lewis, among others, argued for balanced growth including a balance between public utilities and other investments, while Hans-W. Singer, Kurihara, Paul Streeten, Kindelberger etc. held a brief for unbalanced growth. Albert O. Hirschman's strategy of economic development was to create deliberate imbalances in the sectors to provide incentives to growth and ultimately to lead to balanced growth. He argued a case for unbalanced growth not only among sectors but also within the sector in the case of Directly Productive Activities investment and Social Overhead Capital investment. Here again he poses an important problem, whether development occurs through a capacity shortage in SOC (or infrastructure) or through excess capacity. Although Hirschman favours capacity shortage as a better approach in developing countries than excess capacity, Wharton feels that this hypothesis is not empirically established.

70. Wharton, C.R., op. cit. p. 118
Excess capacity of infrastructure is supposed to generate its own demand by lowering costs of production in an area and thereby attracting entrepreneurs seeking higher profits.

II.5 Conclusion:

In the context of economic planning, a better strategy for underdeveloped countries, especially for India, would be "selective growth", rather than "balanced" or "unbalanced" growth. As investment in infrastructure requires priority, any lapses in infrastructural investment and its efficient functioning will thwart the pace of growth. So in the case of agriculture, special attention should be given for the development of agricultural infrastructure.

The present day developed countries had a higher Social Overhead Capital at the time of their take-off into economic growth than the developing countries of today. The neglect of Social Overhead Capital may partly be due to the difficulties of measurement and partly be due to the underemphasis of the importance of agriculture in economic development. As agricultural development is one

of the objectives, an analysis of the important components of agricultural infrastructure in an empirical case would help a great deal in planning for agricultural development.