Economic Development and Agriculture

The importance of agriculture in the economic development of any country, rich or poor, is borne out by the fact that it is the primary sector of the economy which provides the basic ingredients necessary for the existence of mankind and also provides most of the raw materials which when transformed into finished products serve as basic necessities of the human race. In a preponderantly agrarian economy, agriculture plays a most strategic role from several points of view. At a minimum, farm production must be increased rapidly enough to keep pace with population growth. However, in a speedy industrialising economy, this is not enough. Industrialisation necessarily brings with it urbanisation and a rapid expansion of the industrial labour force. This may then be expected to bring with it a rising per capita demand for food, based on higher urban incomes.

In addition to supplying food, agriculture must provide many of the raw materials for industry. For instance, the fate of textile industry will be crucially affected by the supply of raw cotton; leather goods industry will depend on the availability of hides and skins; food processing brew and tobacco manufactures will all be dependent on agricultural supplies. Therefore, the pace of advance in a wide range of

consumer goods manufactures will be eventually affected by the pace of agricultural development.

In addition, agriculture must generate export surpluses in order to earn the foreign exchange with which to finance the import of capital goods and certain kinds of industrial raw materials.

However, agriculture is not only a supplier of goods for domestic and export needs but is also a supplier of production factors such as capital and labour. A rapidly expanding industrial sector necessarily draws some of its labour force from the rural areas. Moreover, in one form or another, agriculture is called upon to save and finance a significant part of the investment for an expansion of industrial plant, transport and other sectors as well.

Moreover, farmers constitute a bulwark for social stability. They are assumed to be more industrious, less greedy and unenamoured by urban glamour. As they are less ambitious, they lead a contented life. With their typical sense of contentment, cheerful natural environment, self-sufficiency, and close-knit happy family life, they are relatively immune and invulnerable to the appeals of radicalism revolution, foreign ideologies and violence. It is well known that agriculture represents not only a predominant occupation of people in underdeveloped countries but also a culture by itself firmly rooted in the institutional set up.

The ideas which formed the intellectual and emotional basis of agricultural fundamentalism have deep roots in human history. For, mankind throughout-most of its existence has been either pastoral or farm people earning livelihood directly from earth. The shift to industrialism and urban living is of recent origin almost a current development when considered in the correct historical perspective.

The Physiocrats

Early theoretical literature on the role of agriculture in economic development can be traced to as far back as the

eighteenth century in the writings of the physiocrats. Their doctrine constitutes the beginning of agricultural fundamentalism. The physiocrats discarded the mercantilist belief that wealth and its increase were due to exchange. They transferred it to the sphere of production, the power of creating wealth and the surplus which might be available for accumulation. The central point of their analysis was the search for this surplus and they formulated three basic tenets.

The first principle of physiocracy is that agriculture is the only productive industry and consequently the source of all wealth for the economy. It was their view that only agriculture, turned out a "net product" over and above its cost of production. They believe that the amount of food consumed by the workers plus what is used as seed is on the average less than the amount of produce raised from the ground.

Hence, the labour in agriculture is only productive, all the other labour employed in industry and commerce is sterile because they produce no net product, but only change the form or the title to the wealth produced by agriculture. According to Turgot, "what the agriculturist's industry causes the earth to produce beyond his personal wants is the only fund for the salaries which all the other members of the society receive." The degree of higher productivity of labour which made surplus possible made its appearance in agriculture and this surplus is a gift attributable to the productivity of nature not to the productivity of labour.

The second tenet of physiocracy was the beneficial role of natural order. Agriculture, according to them, is in accordance with natural order deriving the fruits of earth as given by God, whereas the products of the art made by man who is powerless to create. The essential aspects of natural order were the right to enjoy the benefits of property, to exercise one's labour and to follow one's self-interest.

The third principle of physiocracy is *laissez-faire* policy that state should not interfere with economic activity. As agriculture only created surplus value in conformity with the benevolence

of nature, any interference with the natural order will lessen its contribution. Economic liberty is necessary for agriculture to encourage the production of surplus which makes a prosperous economy possible. Thus, free trade within a nation and between nations is required.

Adam Smith

Importance of agriculture in economic development was recognised by the classical writer's too. In view of the essential similarity in the political and economic climate in which Adam Smith and the physiocrats lived, it is not surprising to find that the general outlook of Adam Smith was not essentially different from the views of the founders of the French political economy. Smith's application of naturalism, his optimism in the role of invisible hand and his attack on mercantilism made him a great champion of *laissez-faire* than the physiocrats.

Adam Smith stated that it was a mistake to retard commerce and industry for the sake of agriculture. Nevertheless, Adam Smith considered agriculture as more productive than commerce and industry, because the forces of nature labour along with man.

Adam Smith indulged in the contrast of natural generosity of farmers with the ugly self-interest of those engaged in commerce and industry, in spite of his belief in the principle of self-interest as fundamental force of society and as the chief motive in life. He also agreed that investment in agriculture was quite in accord with the general interest of society. Hence, he may be considered to be an agricultural fundamentalist.

It is now believed that Adam Smith basic growth model refers only to the agricultural sector. Food, according to Smith, is the conditional factor in the growth of an economy. In his system, technical improvement in agriculture is the pivotal point for sparking of development in other sectors of the economy.

Let us suppose that we have a given stock of corn output from the previous year and wages paid in terms of corn are

fixed. If average labour productivity is given, we can determine the produce of the present period S. Let:

S_{t-1} = corn output of the previous year (or wage fund). w = average wage per worker per period. p = average labour productivity.

Then $$S_t = \frac{S_{t-1}}{w} . p$$

We have assumed here that whole produce of the previous year has been converted into wage fund. But in actual practice, a proportion of this produce may be consumed by unproductive labourers. Let (1 - k) be unproductive consumption of corn from the previous year. Then this year's corn output will be—

$$S_t = \frac{(S_{t-1})K}{w} . p$$

Growth rate of the economy *(g)*, therefore, may be defined as:

$$g = \frac{(S_t - S_{t-1})}{S_{t-1}} = \frac{p/w(S_{t-1}).k - S_{t-1}}{S_{t-1}}$$

$$= (p/w)k - 1$$

Hence, in Adam Smith's growth model, growth rate depends upon the value of p, w and k. Out of these parameters, the value of w and k are determined institutionally. Value of p depends on the stock of capital invested and the level of technology. Hence, in Smith's system, technical improvement in agriculture is the pivotal point for sparking off development in other sectors of the economy.

According to Smith, when by the improvement and cultivation of land, the labour of one family can provide food for two families, the labour of half the society becomes sufficient to provide food for the whole. The other half, therefore, can be employed in providing other things or in satisfying the other wants and fancies of mankind. The creation of an agricultural surplus is *sine qua non* for generating demand for other goods and services which could be purchased with the

excess supply of agricultural products. Therefore, every increase in the surplus brings about more specialisation in industry through the division of labour.

Ricardo

Ricardo had scientifically explained the idea of Adam Smith. Ricardo considers agriculture as the most important sector of the economy. The difficulty of providing food for an expanding population serves as the focal point for his entire analysis. The central problem for classical economists was the analysis of the overall movement of the economy through times involving changes in population, capital accumulation and technical progress.

According to Adam Smith, the objective of economic analysis was the understanding of the nature and the causes of the wealth of nations. But to David Ricardo, the principal problem of political economy was to determine the "laws which regulate the distribution of commodities among the classes of society". It was through the laws which regulate distributive shares that he was trying to build up a simple macroeconomic model of economic development.

In Ricardo's vision of economic society, there are three major groups of actors on the economic scene: landlords who provide land, capitalists who provide capital and workers who provide labour.

In the progress of society by means of an expansion in population and an accumulation of capital, there arises, according to Ricardo, an increasing scarcity of the most fertile types of land. In order to meet the rising demand for food, the successive employment of equal units of labour and capital on poorer grades of land (together with the more intensive use of labour and capital on better grades of land) brings diminishing returns in terms of agricultural output. As poorer lands are brought under cultivation and diminishing returns occur, competition among the capitalists for the better grades

of land causes a portion of produce of the land to be transferred to the landlords in terms of rent.

The rate of wages, according to Ricardo, is determined by the cost of subsistence. His assumption is that labourers have to be paid a minimum subsistence wage (food and other necessaries) if the supply of labour in the long-run is to be kept intact. This implies that, as the population grows, wage rates in money terms must rise (because foodgrains prices have risen due to the extension of margin of cultivation). This, in turn, squeezes the profit rate in agriculture and manufacturing. A lower profit rate curtails the rate of capital accumulation and in turn, the rate of growth in national income declines.

Thus, the law of diminishing returns from land dominates the economic scene and governs the fortunes of all classes. Ricardo thus showed how shortage of land would set a limit upon the expansion of agriculture and, therefore, by implication, upon that of the economy generally.

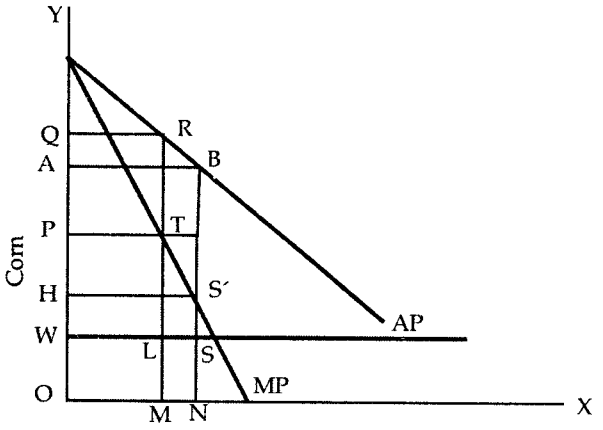


Fig.

Ricardo's thesis can be illustrated in Fig. above where *OY* measures quantities of corn and *OX* measures the amount of labour employed in agriculture. The curve *AP* represents the

average product of labour and *MP*, the marginal product of labour. With *OM* amount of labour employed in agriculture sector, *OQRM* total corn is produces. Rent, according to Ricardo, is difference between *AP* and *MP*.

At the subsistence wage rate *OW*, the supply curve of labour *WL* is infinitely elastic, and the total wage bill is OWLM. Total profits WPTL are the residue after deducting rent and wages from the total produce, i.e.

$$WPTL = OQRM - (PQRT + OWLM)$$

Total output increases with economic development and with it the wage fund also rises. This leads to a proportionate increase in the amount of labour (population) which in turn increases the demand for corn which will result in rise of its price. As agricultural operations are subject to law of diminishing return rents continue to rise and profits, therefore, have a tendency to fall.

When amount of labour applied to agriculture sector increases from *OM* to *ON*, the total output increases to *OABN*. Out of this, *OWSN* is the total wage bill and *HABS* is the share of rent. The share of profit falls to *WLS'N*. This implies that as economic development proceeds, real wage-rate remains at the subsistence level and profits tend to fall. Obviously the change in national income goes in favour of landlords.

Limit on Growth

The Ricardian model of growth shows the accumulation capital, specially of corn surplus, as the main source of economic expansion. By analysing this aspect of growth, what Ricardo tried to show was how shortage of land would set a limit upon the expansion of agriculture and, therefore, by implication, upon that of economy generally. His two sector analysis of growth thus, shows how the operation of diminishing returns in agriculture will set a limit on the process of growth in non-agriculture by limiting the growth of working capital (wage goods) needed for the expansion of the later.

Let us suppose that total output (Y) is sum of agricultural and industrial outputs, i.e., *Ya* and *Yi* respectively. That is Y = *Ya* + *Yi*.

The Ricardian theory of distribution states that:

$$Ya = Wa + S \text{ and}$$

$$Yi = Wi + P$$

Where

Wa = Wage bill in agriculture,

S = Surplus Corn output.

Wi = Wage bill in industry.

P = total profit in industry.

Let us suppose that $Wi - S$ because the wage bill of industrial sector depends on surplus corn output in agriculture sector. Hence,

$$Yi = Ya - Wa + p \quad (\because Ya - Wa = S)$$

Dividing by Y on both sides, we get:

$$\frac{Yi}{Y} = \frac{Ya - Wa + P}{Y}$$

$$\frac{Yi}{Y} \text{ (Share of industrial output)} = \frac{Ya}{Y} - \frac{Wa}{Y} + P/Y$$

The above equation shows that the share of industrial output in total output depends on the ratios of $\frac{Ya}{Y} - \frac{Wa}{Y}$ and $\frac{P}{Y}$. This also indicates that greater the ratio of $S/Y = \frac{(Ya - Wa)}{Y}$; greater the ratio of Yi/Y and greater the ratio of Yq/Y, greater the value of Yi/Y, assuming W/Y and P/Y as constant. An increase in Wa/Y will adversely affect the expansion of industrial output.

Thus, according to Ricardo, if agricultural output does not grow at a rate which is required to generate an amount of wage goods in order to cope with the demand of these goods

for industrial workers, there is always tendency to raise money wage rate and as a consequence profit is bound to fall. According to Ricardo, "It is by the rise of price of corn that all other profits are regulated by agricultural profit. If the price of corn remained low, money wages would not rise and general profits could not fall."

It was only after Keynesian revolution in the 1930's that intellectuals started showing more interest in the theories of economic development. After the Second World War with many colonies winning their independence, literature on economic development started appearing. In the modern literature, role of agriculture in economic development has been further stressed.

Most of the underdeveloped countries who won their independence after the Second World War mostly suffered from three major features which impede their process of growth. The first feature is the existence of abundant supply of labour with marginal productivity of labour being negligible or approaching zero. The second is the underdeveloped nature of agriculture leading to low productivity of land. The third is the smallness of the capitalist sector with inadequate inevitable surplus for economic development.

Lewis Theory of Unlimited Supplies at Labour

Lewis in his well known article, "Economic Development Unlimited Supplies of Labour" presented a two sector model and investigated the expansion of the capitalist sector as it is fed by supplies of cheap labour from the agriculture sector. According to Lewis, under conditions, prevailing in majority of underdeveloped countries, the classical assumption of unlimited supply of labour is more relevant. Due to rapid rise in population in the countries, surplus labour exists in large sectors of economy where marginal productivity of such labour is negligible, zero or negative.

Lewis analyses the process of economic expansion in a dual economy composed of a "Capitalist" sector and a

"Subsistance" sector. Output per head in subsistance sector is lower than that in the capitalist sector. People in subsistance sector are generally backward, illiterate and unskilled with the result that their average productivity is low. On the other hand, people engaged in capitalist sector are advanced, literate and skilled.

The basic assumption of Lewis', Model is that there exists surplus labour in the subsistance sector. Such labour is there either with zero marginal productivity or having marginal productivity much less than the institutional wage. According to Lewis, the surplus labour in the subsistance sector acts as a source from which an unlimited supply of labour can be drawn for the development of the capitalist sector. "In this situation, new industries can be created or old industries can be expanded without limit at the existing wage, or to put it more exactly, shortage of labour is no limit to the creation of new sources of employment".

In Lewis' model of growth, savings play a crucial role. In his model, if capitalists do not reinvest a larger and larger proportion of their profits, neither will the total product expand nor will opportunities for employment increase. "The central problem in the theory of economic development is to understand the process by which a community has previously been saving and investing 4 to 5 per cent of its National income or less, converts itself into an economy, where voluntary saving is running about 12 to 15 per cent of national income or more.

As explained above, surplus labour exists in the subsistance sector and it can be attracted to the industrial sector if it is offered a wage rate which is a little higher than the institutional wage rate prevailing in the rural areas. Capitalist wage is generally higher than the subsistance earnings in order to compensate labour for the cost of transferring and to induce labour to leave the traditional life of the subsistance sector. At the existing capitalist wage, however, the supply of labour is

considered to be perfectly elastic. This situation has been illustrated in the following Fig.

In this figure, *OW* is the real wage rate in the capitalist sector and *WS*, the perfectly elastic supply of labour. Given a fixed amount of capital at the outset, the demand for labour is initially represented by the marginal productivity schedule of labour, N_1 D_1. If OW is the current wage rate, the amount of labour employed in the capitalist sector is *OL*, and beyond *L*, workers earn whatever they can in the subsistence sector. The total product N_1 *PLO* in the capitalist sector will then be divided between wages in the amount *OWPL* and the capitalist's surplus in the amount WPN_1.

Quantity of Labour

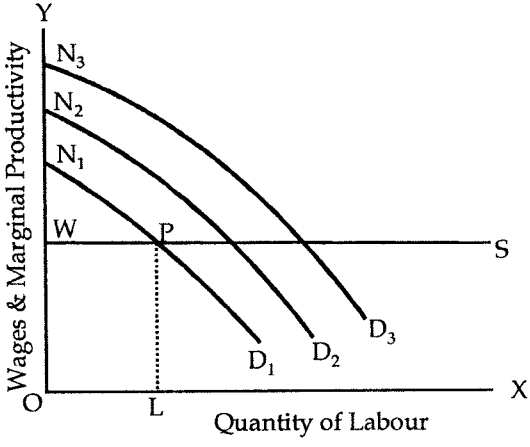


Fig.

In tracing the process of economic expansion, Lewis emphasises that the key to the process is the reinvestment of the capitalist system. As the capitalist sector expands, labour is withdrawn from the subsistence sector into wage employment, the surplus then becomes even larger, there is still more reinvestment of profits, and the process continues on, progressively absorbing the surplus labour from the subsistence sector.

The process of capital formation, as envisaged by Lewis, comes to an end when capital accumulation catches up with population, so that there is no longer surplus labour in the subsistence sector left to be absorbed in the industrial sector. Beyond this point, real wages no longer remain constant, but instead, rise as capital formation occurs. It will now be in the interest of the producers in the subsistence sector to compete for labour since the marginal product of labour will no longer be below the institutional wage. When this point is reached, the agricultural sector is said to have been commercialised.

Fei and Ranis Model

Attention needs to be drawn to the fact that both Nurkse and Lewis recognised the importance of agriculture in providing "wage goods" to the industrial workers. Failure to provide food could seriously limit the process of economic expansion envisaged by their models. Yet they did not seriously prescribe a clear and suitable line of action which could keep off such a danger to the process of economic development. Fei and Ranis are too careful to miss laying stress on the strategic role that agriculture is desired to play in the entire development effort.

In their view: "The strategic nature of agricultural sector in the dualistic economy is due not only to its preponderant size but also .... to the peculiar production and consumption conditions attached to the agricultural goods."

Unlike Nurkse and Lewis, agricultural innovations and austerity are brought to the forefront of the development effort, given due recognition and put in their proper perspective by Fei and Ranis.

The Fei-Ranis model also focuses attention on the transfer of labour from the agricultural to the non-agricultural sector as central to economic development. Major and well-recognised social problem of underdeveloped countries, according to Fei and Ranis, is the existence of the so-called overpopulation in

its agriculture sector. This denotes the persistent pressure of population against scarce resources, mainly land and thereby leading to the worsening land-labour ratio. Classical growth model and the pessimistic conclusions of Ricardo and Malthus based on the assumption of stationary technology and the law of diminishing returns in the agricultural sector has been depicted by Fei and Ranis in Fig. below.

In bellow Fig.; the inputs used are labour and capital which have been measured on horizontal and vertical axes respectively. Production contour lines are represented by curves M, M′, M″ .... For the sake of simplification, constant returns have been assumed. Ridge lines OV^* and OU^* mark off the region of factor substitutability, *e.g.*, below OV^*, the production contour lines become horizontal indicating that with land held constant, any further increase in labour renders that factor redundant as output can no longer be increased. If the total amount of land is supposed to be *Ot*, the amount of labour which can be absorbed without becoming redundant can be determined by the ridge line, *ts*.

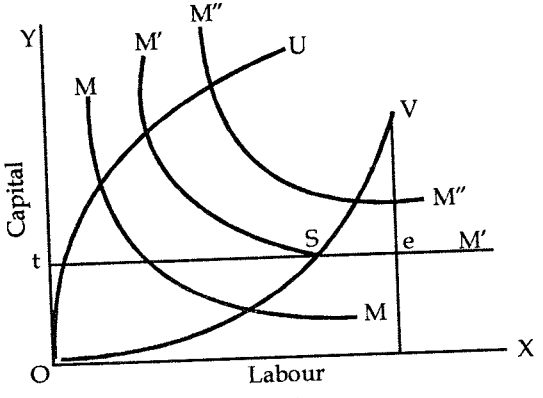


Fig.

Therefore, the labour utilisation ratio $R = ts/ot$ (labour which can be employed per unit of land productively) which is the slope (inverted) of the ridge line OV^*. The population density (number of workers per unit land) in the agricultural

sector, called the endowment ratio S = *te/ot*. The labour force which is productive is *ts* and the surplus labour is *se*. The fraction of the existing agricultural labour force which is productive is called the non-redundancy co-efficient *T*, which is equal to:

$$\frac{ts}{te} = \frac{ts/to}{te/ct} = \frac{R}{S}$$

Non-redundancy radio *T*, therefore, is directly proportional to the labour utilisation ratio *R* and inversely proportional to the endowment ratio *S*. It describes how favourably a given economy is endowed with arable land relative to its agricultural population under the existing conditions of production techniques.

When the amount of arable land is given, the production conditions described above can be pictured alternatively by familiar curves representing total physical productivity of labour (TPP_L) and marginal physical productivity of labour (MPP_L).

Fig. shows TPP_L and MPP_L curves. It is clear from Fig. that TPP_L increases at a decreasing rate when more and more labourers are added to the fixed amount of land *ot*, until it becomes horizontal at M. Similarly, the curve MPP_L gradually decreases as the law of diminishing returns is making its effect felt, until at point G, the MPP_L becomes zero.

In the context of Fig., the non-redundancy co-efficient *T* is equal to *OQ/OP*.

From Fig., average productivity *APP* = *MP/OP*

The institutionally determined real wage level is set near subsistence and is related to the average productivity of agricultural labour APP_L. This is called the constant institutional wage (CIW).

From Fig. bellow, the portion of redundant labour force in the economy = *PQ*. If out of this redundant labour force, *PY* is allocated to the industrial sector, the remaining labour

force in agricultural sector produces an output of *YZ* units, while at constant institutional wage, its total real income is represented by *XY* units. The difference *XZ* represents the agricultural surplus. This total agricultural surplus *TAS* emerges as a result of the allocation of the redundant labour force *PY* out of the agricultural sector. Redundant labour force in agricultural sector disappears at *Q* and at this point, the disguised unemployed agricultural labour force disappears and commercialisation of agriculture occurs.

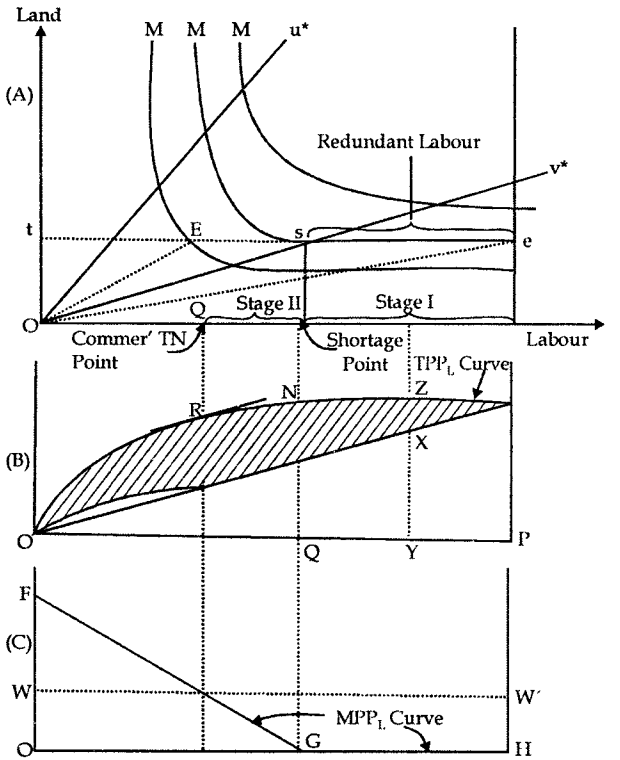


Fig.

In order to have a total view of development process in the context of dualistic economy, we now turn to the industrial sector. The role of industrial sector is essentially related to the expansion of employment opportunities required for the

absorption of the surplus labour force released by the agricultural sector and thereby a gradual expansion of industrial productive capacity and output.

Diagrammatic Exposition

The process of labour absorption by the industrial sector of the dualistic economy has been exhibited diagrammatically in the previous figure. In the double deck diagram given below, upper deck represents the production contour map of the industrial sector.

The production contour lines indexed by Q_0, Q_1, Q_2 are once again assumed to exhibit the property of constant returns to scale. The central expansionary role of the industrial sector may be symbolically represented by an expansion path through time A_0, A_1, A_2, representing a gradual expansion of the capital stock K_0, K_1, K_2, of the industrial labour force L_0, L_1, L_2, and industrial output Q_0, Q_1, Q_2.

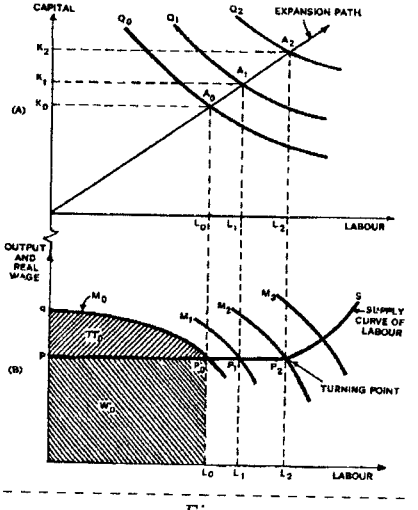


Fig.

The lower deck in the figure above shows the marginal productivity of labour *(MPL)*. In this figure, *PS* represents the supply curve of labour to the industrial sector. Its horizontal

portion PP_2 corresponds to the existence of the pool of redundant labour which can be absorbed by the industrial sector at a constant wage W, which is greater than W, the subsistence institutional wage. The rising portion *PS* curve is marked by a turning point P_2, which corresponds to the situation when redundant labour is completely absorbed by the industrial sector.

With respect to the industrial sector of the dualistic economy is reasonable to accept the customary competitive assumptions in the labour market implying that industrial entrepreneurial behaviour is characterised by profit maximisation. Under this assumption, the marginal productivity of labour takes an operational significance as the industrial demand curve for labour.

For each amount of capital stock K_0, K_1, K_2, the marginal physical productivity of labour curve *(PPL)* may then be drawn, that is, curves M_0, M_1, M_2. The competitive employment equilibrium positions in the labour market are consequently indicated by the intersections of these curves with the industrial supply curve, *i.e.*, points P_0, P_1, P_2.

Let us suppose that there exists a stock of real capital goods of volume K_O in the industrial sector. The equilibrium employment position is then determined by curve M_O and indicated by the point P_0. At this point, the industrial sector is making profit (represented by the shaded area *PPO)* and the magnitude of total real wage income is W_0 $(OL_0\ P_0P)$. At the low level of per capita income, it is reasonable to assume that workers do not save but industrial profits (II_0) constitute the major source of investment funds originating in the industrial sector.

Moreover, in determining the total supply of investment funds available for industrial capital accumulation, it should be noted that there exists a second important source, the hidden rural savings. If these savings (say) so are siphoned off to the industrial sector, then the total investment fund of the industrial

sector is $II_0 + S_{O'}$ SO that the total capital stock in the next period will be K_1

With this new capital stock K_1, a new MPP_t curve is determined, $M_1 0$. This determines a new equilibrium position P_1 causing an increase in employment of labour by the amount $L_0 L_1$. This represents an additional transfer of labour from the agricultural sector to the industrial sector as a result of capital accumulation.

In this fashion, we have shown how the agricultural sector constitutes an important source of supply of both manpower and savings for fuelling the expansion of the industrial sector. According to the above described process, industrialisation and output growth may be viewed as a continuous shifting of the MPP_L curve to the right ($M_0 M_1 M_2$) through time. Associated with such a shift, there must occur a continuous process of reinvestment of industrial profits (II_0 II_1 II_2) and of the channelisation of agricultural surplus (S_0 S_1 S_2) into the industrial sector in order to finance a continuous expansion of industrial capital stock (K_0 K_1 K_2). This, in turn, leads to a continuous increase in the demand for, and employment of, labour (L_0 L_1 L_2) and a continuous expansion of industrial output (Q_0 Q_1 Q_2)

In this manner, we have briefly outlined the crucial significance of the agricultural sector in the economic development, in that it constitutes an important source of supply of both manpower and savings for fuelling the expansion of the industrial sector. Disguised unemployment in over populated economies responds to stimulants of economic growth by providing cheap labour at constant real wages for non-farm sectors. During this phase, it is plausible to improve agricultural productivity by relaxing the constant real wage assumption. The development of agriculture raises the rural purchasing power and provides a mass market for industrial goods and results in the expansion of investment opportunities.

It is, thus, obvious from the contribution of Lewis and Ranis and Fei that mobility of labour from the farm to the non-farm sector is an essential ingredient of economic transformation as well as development of agriculture.

Experience of all the developed economies indicates that due to the operation of various pull and push factors contributing to the migration of labour from rural to urban areas, the share of agricultural sector in the total labour force of the country diminishes. Consequent upon the transfer of labour from the agricultural sector, the productivity of labour and capital in the farm sector increases and this leads to an increase in the earnings of farmers. Increased earnings of farmers create essential conditions for the adoption and absorption of new agricultural strategy, which in turn contributes to enhanced returns per acre.

It is now customary to summarise in four ways how greater agricultural productivity and production contribute to an economy's development:

1. It helps in faster development by supplying foodstuffs to the rapidly increasing population and raw materials to other expanding sectors in the economy;
2. The developing agricultural sector also provides an investible surplus of savings and taxes to support investment in another expanding sector;
3. The rising agricultural income of the agricultural sector will raise the demand of the rural population for products of other expanding sectors;
4. It can also contribute to the economic development of an economy by relaxing the foreign-exchange constraint by earning foreign exchange through export or by saving foreign exchange through import substitution.

Kuznet summarises these contributions as:

1. The product contribution.
2. The factor contribution.
3. The market contribution.

Precisely, the most important contribution of agriculture to the economic development is that constituted by growth of product within the sector itself. An increase in the net output of agriculture, in and of itself, represents a rise in the product of the country – since the latter is the sum of the increases in the net products of the several sectors.

This product contribution can be examined firstly as a contribution to the growth of total net or gross product, and secondly to the growth of product per capita. Algebraic notation of the above argument is given below:

Pa = Product of agriculture sector (Sector A)

Pb = Product of all other sectors (Non-Agriculture Sector B)

P = Total product = $Pa + Pb$

Δp = Increment in total product

Y_a = rate of growth of Pa

Y_b = rate of growth of Pb, so that

$Pa^1 = Pa^0 (1+Y_a)$, the subscripts referring to time

$Pb^1 = pb^0 (1+Y_b)$

Then, $AP = Par_a + Pbr_b$

The equation for the share of the growth of agriculture product in the growth of total product is therefore:

$$t = \frac{P_a r_a}{\Delta P} = \frac{1}{1+\left(\frac{P_b}{P_a} \times \frac{\gamma_b}{r_a}\right)}$$

Thus, according to Kuznetz; if at the initial point of time, the share of agricultural sector in countrywide product is 60 per cent – and if over the next decade the rate of growth of the no – A sector *(rb)* is four times as high as that of the A sector (*ra*), the product contribution of agriculture to the growth of total product will be one divided by [1+ (0.67 × .4)] or about a quarter.

The product contribution of agriculture towards an overall economic development takes two forms.

These are:

Provision of Wage Goods: Economic development is characterised by a substantial increase in the demand for agricultural products and failure to expand food supplies in pace with the growth of demand can seriously impede economic growth. Developing phase of an underdeveloped economy results in *(i)* increased population, *(ii)* Shifting of labour from rural areas to urban areas, *(iii)* increase in per capita income. All these changes would lead to higher demand for foodstuffs.

The annual rate of increase in demand for food is given by $D = P + ng$, where P and g are the rate of growth of population and per capita income and $r\backslash$ is the income elasticity of demand for agricultural products.

As indicated by Johnston and Mellor, not only are there high rates of population growth in *LDCs* but the income elasticity of demand for food in these countries is considerably higher.

If food supplies fail to expand in pace with the growth of demand, the result is likely to be a substantial rise in food prices leading to political discontent and pressure on wage rates with consequent adverse effects on industrial profits, investment, and economic growth.

Provision of Industrial Raw Material

Economic history of most of the advanced countries will show that the agro-based industries were first to develop in such countries. These industries which draw their basic raw material from agricultural sector will flourish only if a continuous supply of such raw material is made available to them. In the first phase of industrialisation of an economy, agro-based industries get priority firstly because it is easier to

produce raw materials in the agricultural sector. And secondly such industries can be started with traditional technology. It is also easy to shift labour from agricultural sector to such factories. To conclude, the industrial development in the initial stages requires that more of its raw materials have to be produced in the agricultural sector.

Market Contribution

According to Kuznetz, market contribution of a sector takes place when "the given sector provides such opportunities by offering part of its product on domestic or foreign markets in exchange for goods produced by the other sectors, at home or abroad".

Thus, agriculture makes a market contribution to economic growth by (1) "Purchasing some production items from other sectors at home or abroad; (2) Selling some of its products not only to pay for the purchases listed under (1) but also to purchase consumer goods from other sectors or from abroad or to dispose of the product in any way other than consumption within the sector. In all these ways, agriculture makes it feasible for other sectors to emerge and grow and for international flows to develop; just as these other sectors and the international flows make it feasible for the agricultural sector to operate more efficiently as a producing unit and use its product more effectively as a consuming unit".

A developed agriculture not only enter the market to dispose off its marketed surplus but also makes market contribution by making heavy purchases of modern inputs required for its own development. The forward and backward linkages of developed agriculture thus help in the establishment of most of the industries using either agricultural raw material or supplying agricultural inputs. According to David Metcaff, agricultural development through providing market for agricultural inputs and consumer goods, promotes the development of industrial sector. Developed industrial sector,

in turn, helps in the development of the agricultural sector through the speed of modern technology in agriculture and by providing an expanded market for agricultural products. This is a virtuous circle which in the process gives rise to institutions facilitating two way exchange of commodities.

Developed agriculture can also contribute to the development of international trade. According to Johnston and Mellor, "expansion of agricultural exports is likely to be one of the most promising means of increasing incomes and augmenting foreign exchange earnings in a country stepping up its development efforts". According to Kuznetz, "Since agriculture, after mining, is the sector in which natural endowments have greatest weight, it is hardly a surprise that in the initial stages of growth of many presently developed countries, agriculture was a major source of exports and that the resulting command over the resources of the more developed countries played a strategic role in facilitating modern economic growth".

Factor Contribution

Factor contribution of agriculture ot economic growth occurs when some resources are transferred from agriculture to non-agricultural sectors of the economy. Two most important factors which a developing agricultural sector contributes towards the development of other non-agricultural sectors are capital and labour.

Capital Contribution

An underdeveloped country that is making determined efforts to achieve economic progress faces formidable requirements for capital to finance the creation and expansion of manufacturing enterprises. These requirements are certain to outstrip the supply of funds in most of the underdeveloped countries. "Since there is scope for raising productivity in agriculture by means that require only moderate capital outlays, it is possible for the agricultural sector to make a net

contribution to the capital requirements for infrastructure and for industrial expansion without reducing the low levels of consumption characteristic of the farm population in an underdeveloped country".

According to Mellor, the contribution of the agricultural sector to capital formation may be marshalled in four ways:

1. It may be extracted by the government through the medium of taxes such as land tax, agricultural income tax, etc.
2. Agricultural production may be increased sufficiently to bring about a relative decline in agricultural prices and hence favour increased profits in the non-farm sector which in turn bring about favourable effects on savings and investment in that sector;
3. Agriculture may form capital directly within its own sector and minimise its own demand for capital from other sectors;
4. Agriculture may invest directly in other sectors – perhaps after its own development has increased demand for products from other sectors.

The transfer of capital from agricultural sector to other non-agricultural sectors may be voluntary or compulsory. Compulsory transfer of funds from agricultural sector for the benefit of other sectors is ordinarily done through taxation in which the burden on agriculture is far greater than the services rendered by the government to agriculture. This kind of tax has played a significant role in the early development of Japan, England and Russia.

In Japan, for example, in the last two decades of the 19th century, the land tax was over 80 per cent of the central government taxation. Forced extraction of surplus from agriculture by taxation or arbitrarily keeping low prices of agricultural products have been other measures taken by different governments to transfer funds from agricultural sector to non-agricultural sector.

On the voluntary basis, the farm sector may, of its own, lend or invest its savings in the growth of the non-agricultural sectors. But in the absence of adequate data, it is difficult to measure the extent to which savings originating in agriculture sector contribute to the financing of capital formation elsewhere in the economy.

In the absence of such data we can only speculate on such magnitudes. However, the share of domestic savings originating in agriculture is function of *(i)* the share of agriculture in total income, *(ii)* the lower level of real income in agriculture than in the total sectors, and, *(iii)* the relative propensity to save of the agricultural population and of other groups in the economy.

Nurkse has referred to another way through which agriculture can provide capital to non-agricultural sectors. Another way of transferring resources from agricultural to non-agricultural sectors is by the government turning the terms of trade against agriculture by imposing price controls on agricultural products.

If the improvement in the terms of trade in the non-agricultural sectors raises their incomes, and beneficiaries save at a higher marginal rate than the decreased agricultural incomes, aggregate saving rates will increase and thus, agriculture will have made a net contribution to total savings in an indirect manner.

Labour Contribution

Another important factor contribution of agricultural sector to the non-agricultural sector is the provision of labour. In most underdeveloped economies, due to rapid rise in population and absence of manufacturing sector, agricultural sector sustains more labour than required. This type of labour is known as disguised labour. With the overall development of the economy, labour migration takes place from agricultural sector to non-agricultural sector.

In the earlier stages of the development of an underdeveloped economy, the bulk of the labour for the expanding sectors must be drawn from agriculture simply because there is almost no other source.

Kuznetzs has expressed the importance of transfer of labour from the agricultural sector to non-agricultural sectors in another way. According to him, this transfer of workers from agricultural sector to non-agricultural sector means a sizeable capital contribution because each migrant is of working age and represents some investment in past rearing and training to maturity.

This factor contribution of the agricultural sector to non-agricultural sectors must have been quite large in the early and even later phases of modern economic growth.

Agricultural Fundamentalism

A group of thinkers (Barker, Wilson Barsodi and Humphries, etc.) have commonly held the orthodox view that agriculture is par excellence a fundamental industry.

They support this contention with the explanation that agriculture being the producer of basic food for the human beings is the basis of existence of the human race. Besides, it produces raw materials for many industries and also is an important constituent of trade. Hence, it is a foundation of manufacture as well as commerce.

Adam Smith in his *Wealth of Nations* took vigorous exception to the physiocrats' notion that agriculture is the only productive activity, but still he ranked agriculture as the highest in wealth-creating powers. 1798, laid a very pronounce emphasis on agriculture.

T.R. Mathus, in his first easily on population, which appeared in 1978, laid a very pronounce emphasis on agriculture. The fate of capitalistic economy, according to Ricardo, purely depended upon the yield rate in the agricultural sector.

Henry Carey and his father, Mathew Carey, though strong exponents of industrialisation, still affirmed the overwhelming importance of a prosperous agriculture.

To these beliefs that agriculture is the basic industry, and any philosophy that may be invented to go with it, Dr. S. Davis of the food Research Institute, in an essay published in 1935 gave the name, "Agricultural Fundamentalism".

This view has been challenged by another group of modern thinkers. T.S. Davis, who is one of the most popular representatives of this group is of the view that "the wealth and welfare of nations depend upon many complex conditions. Today, agriculture is not uniquely basic and the prosperity of a nation depends largely on other factors than the work of those who till the soil". This view has been supported by the argument that with the progress of any society, the relative importance of agriculture had always declined.

Both the above views stand poles apart. A more balanced view has been taken by the economists like Karl Brandt, H.R. Tolly and P. Chew who assign the agricultural sector a status equal to that of other sectors of economy. K. Brandt holds that, "farmers are a vital part of the arterial system of circulation through which flow the goods and services of the national economy.

The nation depends on properly functioning farms as an important source of primary materials, food, and fibres, yet the farms cannot be treated as an independent object of policies, nor can they be made prosperous in emancipation from the remainder of the economy. Nor can the conditions creating mass unemployment and decreased output in cities be cured by maintaining or restoring economic well-being to the farmers alone."

A still better explanation has been held by the writers like Shultz, W.W. Wilcox and others. They believe that there is interdependence and close relationship of the various sectors

of economy. In this connection, Wilcox says, "when we say that it is any sense more a generator of income in modern society than other occupations, we fail to understand the true nature of other occupations, we fail to understand the true nature of modern economic society.

An efficient agriculture made up of farm families with a high standard of living and a high buying power per person contributes much towards a high national income and the economic "well-being of the nation, but the same can be said for each of the other groups it is impossible to say which is most important in modern economic society".

Declining Importance of Agriculture

In the developing countries which are predominantly agricultural, the share of agriculture in national income is quite substantial. As the country starts developing, there is gradual decline in the contribution made by agriculture to national income.

As the economy grows and industrial sector develops, two things happen (1) importance of the agricultural sector as the one which initiates and sustains economic growth starts declining; and (2) importance of agriculture sector as the premier sector of production also starts declining.

At the higher stage of development, as industrial sector develops, its dependence on the agricultural sector for the provision of the various factors of production as well as raw materials declines. Industrial sector starts generating its own savings and thus capital begins to be supplied by the industrial sector itself.

The dependence of industrial sector for agricultural raw materials also declines since new technology makes it possible to develop mining industry and many mining based industries come into being. Similarly need for labour also is cut down since capital intensive technology replaces labour intensive technology.

With the development of the economy, Agriculture sector also loses its importance as the main source of national income. In the most highly developed countries, the contribution of agricultural sector to their national income has declined to very low level as is clear from the following table.

Table: Originating from Agriculture

Country	*Percentage of Working Population Engaged in Agriculture*	*Percentage of Gross Domestic Product (at factor cost)*
Canada	5.2	3.4
Denmark	8.3	5.7
France	8.4	4.6
Japan	9.7	3.4
UK	2.7	2.0
USA	3.6	1.6
India	55.4	31.4

Prof. Edward Nissan in his recent study has tried to show this fact by providing a simple empirical measurement for various countries. He has drawn data from various World Bank documents (1984-92).

Prof. Nissan has adopted the World Bank division of the countries into *(i)* low income, *(ii)* lower-middle income, *(iii)* Upper-middle income, and *(iv)* high income, according to levels of income.

Model

Edward Nissan has tried to measure the magnitude of change of the non-agricultural sector to the agricultural sector with the help of a procedure suggested by Ghatak and Ingersent (1984) (Agricultural and Economy Development)

Let P_n and P_a be the gross products of the agricultural and the non-agricultural sect respectively. Then P_n/P_a is a measure of the magnitude of the non-agricultural sector compared to the agricultural sector.

Let the symbol "0" and "1" stand for two distinct periods of time. The magnitude of change in the ratio of the non-agricultural sector to the agricultural sector over this period is approximated by:

$$\Delta(P_n / P_a) = \left(P_n^1 / P_a^1\right) - \left(P_n^0 / P_a^0\right) \quad ...(1)$$

To discover the meaning embodied in equation (1) assume that the period "1" corresponds to t years after an initial period "0".

Then:

$$P_a^1 = P_a^1 (1 + r_a)^t \text{ and } P_n^1 = P_n^0 (1 + v_n)^t$$

Where r_a and r n are the average annual growth rates between the two periods of time. By substitution and simplification in (1)

$$\Delta(P_n / P_a) = P_n^0 \left[(1 + r_n)^t - (1 + r_a)^t\right] / \left[(P_a^0 (1 + r_a)^t\right] \quad ...(2)$$

Equation (2) is of name help in deducing relationship between the agricultural sectors and non-agricultural sectors. For instance, the magnitude is determined by initial ratio $\left(P_n^0 / P_a^0\right)$, and the compound growth of the two sectors $(1+ r_n)^t$ and $(1 + r_a)$ If $r_n > r_a$ and P_n^0 / P_a^0 is relatively large, then the magnitude of change is positive and large.

The major points of interest in this study are the ratio (P_n/P_0) and the magnitude of change $\Delta(P_n / P_a)$ over a period of time. For purpose of comparisons, three periods of time were chosen; 1965, 1984 and 1990. Results of computations of the ratio's P_n / P_a are presented in the following table which tells for each country how many folds larger the non-agricultural sector is than the agricultural sector. Some countries display small magnitudes in 1984 or 1990 or both than in an earlier period.

From the following table, the largest change was witnessed by Hong Kong and Singapore where the ratios in 1984 and 1990 of almost 100 are the largest than those in 1965. For United States and the United Kingdom, the ratio increased from 33 in 1965 to 49 in both 1984 and 1990.

The following table summarises information and shows for each year the mean of (P_n/P_a), expressed as (x), the standard deviation (s), the co-efficient of variation *(cv)* obtained as (S/X) and the minimum and maximum of observations of each of the four groups of economies. As evident from the following table, a systematic change in the average X is apparent both in the direction of time from 1965 to 1990 and in the direction of economies from low income to high income.

In both directions the average magnitude (P_n/P_0) increases – exactly what is expected from economic development theories which proclaim that the agricultural sector shrinks overtime as compared to the other sectors for every country. These theories also hold that as the income rise, the importance of the agricultural sector diminishes.

Prof. Edward summarises his study in the following lines. He writes, "the economy of each nation is made up of three broad sectors; agricultural, industrial and services, while in developing countries the share of the agricultural is large, through the process of development the agricultural sector shrinks in favour of the other sectors. Therefore, one may use the criteria of the ratio of the non-agricultural to the agricultural sector as a means to categorise the level of development of a country.

The World Bank has classified important economies of the world, in a rational manner. The following table shows it well.

Significant Economies (World Bank List – 2009)

Economy	*Code*	*Region*	*Income Group*
Afghanistan	AFG	South Asia	Low income
Algeria	DZA	Middle East & North Africa	Upper middle income
Angola	AGO	Sub-Saharan Africa	Lower middle income
Argentina	ARG	Latin America & Caribbean	Upper middle income
Aruba	ABW	..	High income: nonOECD
Australia	AUS	..	High income: OECD
Austria	AUT	..	High income: OECD
Azerbaijan	AZE	Europe & Central Asia	Lower middle income
Bahrain	BHR	..	High income: nonOECD
Bangladesh	BGD	South Asia	Low income
Belgium	BEL	..	High income: OECD
Bhutan	BTN	South Asia	Lower middle income
Botswana	BWA	Sub-Saharan Africa	Upper middle income
Brazil	BRA	Latin America & Caribbean	Upper middle income
Brunei Darussalam	BRN	..	High income: nonOECD
Cambodia	KHM	East Asia & Pacific	Low income
Canada	CAN	..	High income: OECD
Central African Republic	CAF	Sub-Saharan Africa	Low income
Chad	TCD	Sub-Saharan Africa	Low income
Chile	CHL	Latin America & Caribbean	Upper middle income
China	CHN	East Asia & Pacific	Lower middle income
Colombia	COL	Latin America & Caribbean	Upper middle income
Comoros	COM	Sub-Saharan Africa	Low income
Congo, Dem. Rep.	ZAR	Sub-Saharan Africa	Low income
Congo, Rep.	COG	Sub-Saharan Africa	Lower middle income
Cuba	CUB	Latin America & Caribbean	Upper middle income
Cyprus	CYP	..	High income: nonOECD
Czech Republic	CZE	..	High income: OECD
Denmark	DNK	..	High income: OECD
Ecuador	ECU	Latin America & Caribbean	Lower middle income
Egypt, Arab Rep.	EGY	Middle East & North Africa	Lower middle income
El Salvador	SLV	Latin America & Caribbean	Lower middle income
Eritrea	ERI	Sub-Saharan Africa	Low income
Estonia	EST	..	High income: nonOECD
Ethiopia	ETH	Sub-Saharan Africa	Low income
Fiji	FJI	East Asia & Pacific	Upper middle income
Finland	FIN	..	High income: OECD
France	FRA	..	High income: OECD
Gabon	GAB	Sub-Saharan Africa	Upper middle income
Gambia, The	GMB	Sub-Saharan Africa	Low income
Georgia	GEO	Europe & Central Asia	Lower middle income
Germany	DEU	..	High income: OECD
Ghana	GHA	Sub-Saharan Africa	Low income
Greece	GRC	..	High income: OECD
Greenland	GRL	..	High income: nonOECD
Guatemala	GTM	Latin America & Caribbean	Lower middle income
Guinea	GIN	Sub-Saharan Africa	Low income
Guinea-Bissau	GNB	Sub-Saharan Africa	Low income
Guyana	GUY	Latin America & Caribbean	Lower middle income

Contd...

Economy	*Code*	*Region*	*Income Group*
Haiti	HTI	Latin America & Caribbean	Low income
Honduras	HND	Latin America & Caribbean	Lower middle income
Hong Kong, China	HKG	..	High income: nonOECD
Hungary	HUN	..	High income: OECD
Iceland	ISL	..	High income: OECD
India	IND	South Asia	Lower middle income
Indonesia	IDN	East Asia & Pacific	Lower middle income
Iran, Islamic Rep.	IRN	Middle East & North Africa	Lower middle income
Iraq	IRQ	Middle East & North Africa	Lower middle income
Ireland	IRL	..	High income: OECD
Israel	ISR	..	High income: nonOECD
Italy	ITA	..	High income: OECD
Jamaica	JAM	Latin America & Caribbean	Upper middle income
Japan	JPN	.	High income: OECD
Jordan	JOR	Middle East & North Africa	Lower middle income
Kazakhstan	KAZ	Europe & Central Asia	Upper middle income
Kenya	KEN	Sub-Saharan Africa	Low income
Korea, Dem. Rep.	PRK	East Asia & Pacific	Low income
Korea, Rep.	KOR	..	High income: OECD
Kuwait	KWT	..	High income: nonOECD
Kyrgyz Republic	KGZ	Europe & Central Asia	Low income
Latvia	LVA	Europe & Central Asia	Upper middle income
Lebanon	LBN	Middle East & North Africa	Upper middle income
Liberia	LBR	Sub-Saharan Africa	Low income
Libya	LBY	Middle East & North Africa	Upper middle income
Lithuania	LTU	Europe & Central Asia	Upper middle income
Luxembourg	LUX	..	High income: OECD
Macao, China	MAC	..	High income: nonOECD
Macedonia, FYR	MKD	Europe & Central Asia	Upper middle income
Madagascar	MDG	Sub-Saharan Africa	Low income
Malawi	MWI	Sub-Saharan Africa	Low income
Malaysia	MYS	East Asia & Pacific	Upper middle income
Maldives	MDV	South Asia	Lower middle income
Mali	MLI	Sub-Saharan Africa	Low income
Malta	MLT	..	High income: nonOECD
Mauritania	MRT	Sub-Saharan Africa	Low income
Mauritius	MUS	Sub-Saharan Africa	Upper middle income
Mayotte	MYT	Sub-Saharan Africa	Upper middle income
Mexico	MEX	Latin America & Caribbean	Upper middle income
Moldova	MDA	Europe & Central Asia	Lower middle income
Monaco	MCO	..	High income: nonOECD
Mongolia	MNG	East Asia & Pacific	Lower middle income
Montenegro	MNE	Europe & Central Asia	Upper middle income
Morocco	MAR	Middle East & North Africa	Lower middle income
Mozambique	MOZ	Sub-Saharan Africa	Low income
Myanmar	MMR	East Asia & Pacific	Low income
Namibia	NAM	Sub-Saharan Africa	Upper middle income
Nepal	NPL	South Asia	Low income
Netherlands	NLD	..	High income: OECD
New Zealand	NZL	..	High income: OECD
Nicaragua	NIC	Latin America & Caribbean	Lower middle income

Contd...

Economy	*Code*	*Region*	*Income Group*
Niger	NER	Sub-Saharan Africa	Low income
Nigeria	NGA	Sub-Saharan Africa	Lower middle income
Norway	NOR	..	High income: OECD
Oman	OMN	..	High income: nonOECD
Pakistan	PAK	South Asia	Lower middle income
Panama	PAN	Latin America & Caribbean	Upper middle income
Paraguay	PRY	Latin America & Caribbean	Lower middle income
Peru	PER	Latin America & Caribbean	Upper middle income
Philippines	PHL	East Asia & Pacific	Lower middle income
Poland	POL	Europe & Central Asia	Upper middle income
Portugal	PRT	..	High income: OECD
Qatar	QAT	..	High income. nonOECD
Romania	ROM	Europe & Central Asia	Upper middle income
Russian Federation	RUS	Europe & Central Asia	Upper middle income
Samoa	WSM	East Asia & Pacific	Lower middle income
San Marino	SMR	..	High income: nonOECD
Saudi Arabia	SAU	..	High income: nonOECD
Senegal	SEN	Sub-Saharan Africa	Low income
Serbia	SRB	Europe & Central Asia	Upper middle income
Seychelles	SYC	Sub-Saharan Africa	Upper middle income
Sierra Leone	SLE	Sub-Saharan Africa	Low income
Singapore	SGP	..	High income: nonOECD
Slovak Republic	SVK	..	High income: OECD
Slovenia	SVN	..	High income: nonOECD
Somalia	SOM	Sub-Saharan Africa	Low income
South Africa	ZAF	Sub-Saharan Africa	Upper middle income
Spain	ESP	..	High income: OECD
Sri Lanka	LKA	South Asia	Lower middle income
Sudan	SDN	Sub-Saharan Africa	Lower middle income
Swaziland	SWZ	Sub-Saharan Africa	Lower middle income
Sweden	SWE	..	High income: OECD
Switzerland	CHE	..	High income: OECD
Syrian Arab Republic	SYR	Middle East & North Africa	Lower middle income
Tajikistan	TJK	Europe & Central Asia	Low income
Tanzania	TZA	Sub-Saharan Africa	Low income
Thailand	THA	East Asia & Pacific	Lower middle income
Tonga	TON	East Asia & Pacific	Lower middle income
Trinidad and Tobago	TTO	..	High income· nonOECD
Tunisia	TUN	Middle East & North Africa	Lower middle income
Turkey	TUR	Europe & Central Asia	Upper middle income
Turkmenistan	TKM	Europe & Central Asia	Lower middle income
Uganda	UGA	Sub-Saharan Africa	Low income
Ukraine	UKR	Europe & Central Asia	Lower middle income
United Arab Emirates	ARE	..	High income: nonOECD
United Kingdom	GBR	..	High income: OECD
United States	USA	..	High income: OECD
Uruguay	URY	Latin America & Caribbean	Upper middle income
Uzbekistan	UZB	Europe & Central Asia	Low income
Venezuela, RB	VEN	Latin America & Caribbean	Upper middle income
Vietnam	VNM	East Asia & Pacific	Low income
Yemen, Rep.	YEM	Middle East & North Africa	Low income
Zimbabwe	ZWE	Sub-Saharan Africa	Low income

Sectoral Growth Rates and ICOR under Different Sectors of the Economy

Sl. No.	Sector	Eighth plan		Ninth Plan		Tenth Plan	
		Growth Rate (%)	ICOR	Growth Rate (%)	ICOR	Growth Rate (%)*	ICOR
1	2	3	4	5	6	7	8
1.	Agriculture & Allied Sectors	4.69		2.06	4.05	3.97	1.99
2.	Mining & Quarrying	3.59	10.74	3.81	5.44	4.3	7.99
3.	Manufacturing	9.77	6.67	3.69	18.37	9.82	7.77
4.	Electricity, Gas & Water	5.5	18	6.46	15.43	7.99	14.97
5.	Construction	3.56	1.74	6.82	1	8.34	0.99
6.	Trade	9.06	0.54	5.86	1.09	9.44	0.91
7.	Rail Transport	1.95	27.94	4.7	9.87	5.4	14.66
8.	Other Transport	8.42	4.41	5.63	6.09	7.54	5.37
9.	Communications	14.31	7.25	17.14	5.28	15	8.33
10.	Financial Services	10.21	2.23	8.93	1.35	11.69	1.56
11.	Public Administration	3.91	7.82	9.21	4.09	6.43	5.45
12.	Other Services	6.22	4.19	8.19	3.7	9.26	3.53
	Total	**6.54**	**3.43**	**5.35**	**4.53**	**7.93**	**3.58**

Note: These are implicit ICORs calculated over the Plan period. For the Tenth Plan, these are targets. * Estimated
Source: Planning Commission, New Delhi.

Role of Agriculture in India

A flourishing agricultural sector is far more important for the development of Indian economy, since farming is less a business than a tradition in India. Even at this semi-industrialisation stage, about 80 per cent of its population still lives in the rural areas and directly or indirectly depends on agriculture for its livelihood.

The mere existence of about 85 crores of persons which are further multiplying at a rate of 2.5 per cent per annum depends on the developed agricultural sector. Further, most of our traditional industries on whose products depend our bulk of foreign trade and foreign earnings draw their raw material from this very sector. It is the surplus generated by this sector that would help Indian economy to reach the "Golden stage", since the total savings fund is made up of savings from the industrial sector and savings from the agricultural sector,

i.e., $I = S_i + S_a$

where, I = total saving fund.

S_i = savings from the industrial sector.

S_a = savings from the agricultural sector.

S_i is the function of profits generated by the industrial sector, which in turn depend upon the extent of demand created for industrial products by the agricultural sector. If the agricultural sector remains underdeveloped and fails to generate a matching demand for industrial products, profits will fall and we will soon be approaching a stage termed as "stationary state" by classical writers. Hence, the whole burden of increasing investment falls on the agricultural sector, so that.

$$S_a = TAS - f_a - i_{a'}$$

where, TAS is the total agricultural surplus

Fa is the farmer's consumption of agricultural goods

Ia is the farmer's consumption of industrial goods.

From above equation, *Sa* can be increased if we increase the total agricultural surplus, *TAS* and F_a and I_a could be maintained at the same old level. F_a and I_a can be maintained at the old level by the adoption of certain monetary and fiscal measures by the government. *TAS* on which depends our surplus and which in turn would initiate a process of development can be augmented only if we could increase the productivity of our agricultural sector.

We can, thus, say that in the absence of a developed agricultural sector, the base for "take-off" into a mature economy would be weak and Indian economy characterised by widespread disguised unemployment and a high rate of population growth, is expected to remain in a pitiable condition.

The role that the agricultural sector is playing in India at present can precisely be discussed under the following heads:

Share of Agriculture in National Income

The share of agriculture in national income is a crucial indicator of the role that agriculture plays in the economic development of a country. As the country rides on the wheels of progress, the relative contribution of agriculture in national income declines with the country becoming more and more prosperous. The expanding non-agricultural sector diverts surplus manpower from agriculture to industry and the improvements in agriculture enable a smaller number of people to produce for a larger population. With advanced agricultural technology, agricultural products are produced even for exports.

To the extent, therefore, the share of agriculture in national income declines, it marks a better level of economic advancement. On the other hand, agriculture is the single large contributor to national income. Therefore, a progressive agricultural sector means a higher level of national income and consequently, a higher level of economic development.

The Indian economy is still predominantly agricultural, about a half of the country's national income is derived from

agricultural and allied activities which absorb nearly three-fourths of its working force.

Table: Share of Agriculture in Gross Domestic Product (At 1980-81 Prices)

Year	*National Income Rs. (crores)*	*Agricultural Income Rs.(crores) National Income*	*Agricultural Income as % of Total*
1970-71	90,426	35,930	39.7
1980-81	1,22,427	42,466	34.6
1990-91	2,12,253	60,991	28.7
1995-96	2,74,209	68,517	24.9

Two facts are being revealed. One, agriculture and allied industries contribute significantly a high share of the national income. Second, as hinted above, the share of agriculture in national income has been decreasing steadily.

The previous table clearly shows that agriculture even in recent years is by far the most important contributor to the national income, though under the impact of industrialisation, its share has been declining gradually. Its share which stood at 58.9 per cent in 1950-51 has declined to 39.8 per cent in 1983-84 while the share of industries which was 14.9 per cent in 1950-51 has risen to 21.8 per cent in the same period.

Supplier of Substantial Food and Fodder

The importance of the agricultural sector in India can be borne out from the fact that this sector supplies us the necessities of life. Today, Indian agriculture is feeding about 100 million people, besides supplying other necessities of life. India's food production crossed the mark of 200 million tonnes in 1999-2000.

The agricultural sector is also providing all the fodder that is needed to sustain our livestock whose number runs into several crores. About one-fourth of the total world's cattle population live in India. The number of all sorts of livestock such as cattle population sheep, goats, horses, ponies, camels,

etc. was estimated to be 45 crores in 1999-2000. The agricultural sector provides a variety of fodder to feed this large number of various types of animals.

Agriculture as a Source of Livelihood

Agriculture has a greater role in economic development in the less developed countries as it provides livelihood to a vast majority of people living in the country. This figure is not significant in terms of percentages only, but more so in terms of absolute numbers. The agricultural sector provides livelihood to about three-fourths of the Indian population, that is, seven out of every ten persons in India depend on agriculture. At the turn of the century, 71.5 per cent of the total labour force was engaged in agriculture and this situation has not changed until now. According to the 1991 Census, 69 per cent of the working force was still engaged in the primary sector. This indicates that in spite of rapid industrialisation in the country, the primary sector is still the main sector providing employment opportunities to the majority of the workers and has thus, acted as a big hock-absorber. This fact reflects the importance of agriculture and lesser development of other sectors of the economy.

Agriculture and Provision of Employment

Indian agriculture is of considerable importance in so far as it offers enormous scope of alternative employment. Past experience shows that the development of large industries has not helped significantly in absorbing the unemployed labour force. If has been estimated that since 1971, the labour force has increased by about 35 million. Of these, about 25 million have been absorbed in agriculture and 9 million in non-agricultural activities. Thus, the agricultural sector has absorbed a bulk of the additional labour force, though many must have got low intensity employment and consequently low incomes Agro-industries and agro-processing industries hold a great promise for employment in our country. The market has a close relationship with GDP at Factor Cost from Agriculture. The following table depicts important figures.

Gross Domestic Product(G.D.P.) at Factor Cost from Agriculture

(Rs. Crore)

Year	*G.D.P. (Total)*		*G.D.P. (Agriculture)*		*Percentage Share of Agriculture*	
	At Current Prices	*At 1999-00 Prices*	*At Current Prices*	*At 1999-00 Prices*	*At Current Prices*	*At 1999-00 Prices*
1	*2*	*3*	*4*	*5*	*6*	*7*
1999-2000	1786525	1786525	409660	409660	22.9	22.9
2000-01	1925017	1864300	408932	407176	21.2	21.8
2001-02	2097726	1972606	442464	433475	21.1	22.0
2002-03	2261415	2048287	425521	398206	18.8	19.4
2003-04	2538171	2222758	483030	441360	19.0	19.9
2004-05	2877706	2388384	501415	441183	17.4	18.5
2005-06	3275670	2612847	557118	468013	17.0	17.9
2006-07(Q)	3790063	2864309	634519	485937	16.7	17.0

(Q) : Quick Estimates

Source : Central Statistical Organisation, New Delhi.

Agricultural and Industrial Development

The role of agriculture in industrial development can hardly be over looked. In fact, agricultural progress is normally a prerequisite for industrial development. In a relatively closed economy, one of the most important preconditions 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.

Rising agricultural productivity supports and sustains industrial development in several important ways. First agriculture releases a part of its labour force for industrial development while meeting the increasing food needs of the non-agricultural sector.

Second, it raises agricultural incomes, thereby creating rural purchasing power needed to buy new industrial goods.

Finally, it enables agriculture to supply the major wage-good (food) of industrial workers at prices favourable to the profitability of new industry.

In fact, all growth models for surplus labour countries have underlined the importance of agriculture for developing the industrial sector in the initial stages. Agriculture supplies manpower and raw materials to industries and provides a wide market for industrial products. In India, most of our leading industries depend on agriculture for their raw materials. Cotton and jute textiles, sugar, vanaspati, and plantations all directly depend on agriculture.

There are a number of other industries whose dependence on agriculture is direct. These may include hand pounding and husking of rice, crushing of oil, weaving of handloom and khadi cloth, etc. Still other industries like paper, leather and tanning, matches, chemicals, etc. depend on allied activities of agriculture like forestry, animal husbandry, fisheries, etc.

It has been estimated that the industries which draw their raw material from the agricultural sector contribute

nearly 50 per cent of income generated in the manufacturing sector in India.

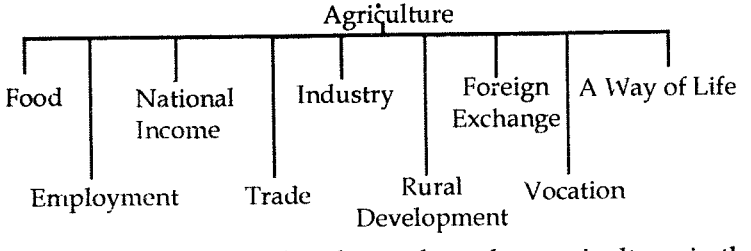
Agriculture and International Trade

Indian agriculture has been a net earner of valuable foreign exchange for the country. Agricultural goods like tea, sugar, oilseeds, tobacco, spices, etc., constitute the main items of exports of India. Agricultural exports constitute a major portion of India's exports and accounted for 50 per cent of the exports at present.

This percentage will increase considerably if exports of jute manufactures and cotton textiles, whose 65 per cent of production cost is accounted for by raw jute and raw cotton, are included in agricultural exports. This has great significance for India's economic development because increased exports help the country to pay for increased imports of oil, machinery and raw materials.

Another important thing about agricultural exports is that while they earn a substantial share of foreign exchange, they do not drain it away through imports. As compared to manufactures, imports required for the agricultural sector have been much less. Besides, agriculture also contributes to national savings and capital formation.

We thus conclude that the agricultural sector occupies a central place in the national economy. The manner in which it contributes to the economic development of the Indian economy can be seen from the chart below:



It is evident from the above chart that agriculture is the backbone of the Indian economy and development of this

sector deserves to be accorded a very high priority in any scheme of resource-utilisation for general economic development. General economic development will require agricultural development either to proceed or to go hand in hand with it.

Indian Planners have already learnt a lesson during the second and third five year plan periods. It has been proved from the experience of Indian planning that failure of agricultural sector to deliver goods would spell disaster to the entire planning process.