CHAPTER III

AGRICULTURAL DEVELOPMENT PROGRAMMES IN ASIAN COUNTRIES IN GENERAL AND INDIA IN PARTICULAR

This chapter is divided into four sections. Section-I deals with agricultural development programmes implemented by Japanese Government. Section-II presents programmes implemented in Taiwan for agricultural development. Section-III gives agricultural development programmes implemented in India and Section-IV provides a comparative picture in the progress of agricultural development programmes in the selected countries and India.

Before 1947, India's agriculture was in a state of backwardness. Productivity per acre and per worker was very low. The techniques used for raising the output were age old, outdated and traditional. Soon after independence, India started thinking in the direction of accelerating the rate of economic development through strengthening the agricultural sector. The Government of India as well as the Government of Karnataka evolved various strategies for agricultural development since the inception of the First Five Year Plan. Before discussing these strategies, it is worth considering the various development strategies adopted in some of the Asian countries for comparative purposes. Besides, by tracing the development programmes of agriculture in these countries, it is possible to get an insight
into the factors that have brought about the development of agriculture in these economies.

SECTION - I

Japan

The farm condition in Japan on the eve of her economic development was more or less similar to that of India in the recent period. Agriculture was the basic occupation of the people and the main source of their livelihood. The manland ratio was very high and markedly unfavourable. Small scale farming persisted throughout the period between 1868 and 1920, which was considered as the modern period of agricultural development. For instance, "in 1908, 69.9 per cent of farm households had holdings of less than 1 hectare, 25.9 per cent held between 1 and 3 hectares and 4.2 per cent owned over 3 hectares. In 1917, these percentages were 69.8, 26.3 and 3.9 respectively and can be taken as some indication that the concentration of tiny holdings remained more or less unchanged". Apart from these, another problem faced by Japanese agriculture was that the major portion of the agricultural land was cultivated by tenants. "In 1903 ... 44.5 per cent of the arable land was cultivated by tenants...


The number of pure tenants (having no land of their own) increased from 19.2 per cent in 1883 to 27.6 per cent in 1915.3

During this period the Japanese Government pursued a positive policy for agricultural development. Highest priority was given for the application of modern inputs such as fertilizers, seeds and machinery. Due to this there was some increase in the inputs applied to farm sector. The index of fertilizer inputs showed a rise to 503 in the period 1913-17 from 100 in 1878-82. During this period, the total current farm inputs increased by 33 per cent.

The HYV seed improvement programme is considered as a significant factor in the Japanese agricultural development. New varieties were innovated and distributed in the 1880's. Better weeding, pest control and crop rotation methods were adopted to increase farm productivity.

The Japanese Government pursued an active policy of helping the improvement of farm practices. The Bureau of Agriculture was set up in 1870. The Ministry of Agriculture and Commerce came into existence in 1871. Apart from these, various research and experimental centres were also set up. "The Naito Shinjuka Agricultural Experiment Station, set up in 1873, demonstrated the operations of farm machineries ..."

In 1879, the Mita Farm Machinery Manufacturing Plant was established... the Komaba Agricultural School founded in 1877 was redesignated as the University of Tokyo in 1890 as an education and training centre... Instructors were invited from Britain... The Government also tried to transplant foreign plants and livestock to Japan. The Mita Botanical Experiment Yard (1874), the Shimofusa Sheep Farm (1875), The Kobe Olive Farm (1879), and the Harima Grape Farm (1880) represented such trials. Added to this, the National Agricultural Association and Agricultural Co-operative Association were set up before 1890's.

The Japanese farmers were reluctant and did not accept the new technologies willingly. Even as late as 1903, it was found necessary to introduce regulations for compulsory adoption of improved seeds, fertilizers, equipments and pest control measures etc.

The new knowledge and ideas of cultivation were propagated through the tightly-knit village communities by outstanding farmers who commanded great respect and to whom the farmers turned up for advice and guidance. Efforts were also made for the spread of better traditional farm practices from advanced regions to backward regions. Further, the Government also succeeded in spreading new knowledge, ideas and improved

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farm practices to all parts of the country before World War I.

Due to spread of new knowledge and practices, farm families started raising two crops in a year, switched over from inferior to superior crops. Area under double cropping was also considerably increased. Farmers started raising superior crops like sericulture, cotton, oilseeds, rice etc. These changes were brought about by changes in demand largely associated with the development of capturing new export markets in the international trade.

The Government encouraged the development of small scale and cottage industries. All small scale sick industries were converted into full time workshops or a small factories. This resulted in the loss of a subsidiary employment for the farm families. They put forth their best efforts and tried to get sufficient farm income to make good their loss of subsidiary income. The Japanese by tradition were lovers of hard work, not imitating others, and conscientious people. They perhaps became even more conscientious as a result of this change.

The increasing farm productivity helped the substantial release of labour force to other non-farm sectors of the economy. As the output of the farm sector increased, the bulk of the increase was mopped up through the budget for building other modern sectors in the economy. Agriculture played a vital role in fetching a huge foreign exchange for
the Japanese economic development. Raw silk and Tea formed the major exports for which the world market expanded rapidly at that time. A market for the growing industrial sector was provided by the farm sector.

Due to adoption of various policies, schemes and measures, land and labour productivity considerably increased. Johnston has estimated that during the 30 years between 1881-90 and 1911-20, Japan increased its agricultural productivity by 77 per cent with the area under cultivation increasing by only 21 per cent as compared with increased yields per acre of 46 per cent. During the same period, population increased much less (44 per cent) while agricultural labour force fell by about 14 per cent. These figures mean that in about thirty years Japan was able to increase per capita food supplies by over 20 per cent and the output per farm worker by 106 per cent.5

Johnston6 rightly pointed that the doubling of labour productivity was mainly the result of increased use of commercial fertilizers, selective breeding, and propagation and distribution of rice strains which would respond most favourably to heavy application of fertilizers. Other factors of

importance were improved methods of water and pest control, cultivation, transplanting and weeding of the growing plants.

The hidden secret of agricultural development in Japan was the application of indigenous techniques. According to Hayami\(^7\) one critical element which stands out in the acceleration in the growth of agricultural productivity is the success in developing a technology consistent with the resource endowments of Japan by improving indigenous โรโน techniques, through the application of modern science. Simple tests and demonstrations in the experiment stations were effective in screening and refining the results of former innovations. The โรโน techniques were based on experiences in the specific localities where they originated. They tended to be location-specific and to require modification when transferred to other localities. Thus the intensive use of indigenous technologies was another important factor for agricultural growth.

The most interesting feature in the agricultural development in Japan was that there was no change in the Agrarian structure during the period between 1868 and 1920. Ohkawa and others\(^8\) study clearly pointed that there was no great change in the structure of her agriculture during this period of growth. The small family farm averaging above one

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hectare per household was retained. There was no change in the distribution of land between peasant proprietors and tenants. The rents were high. There was no strong trend of land consolidation and no rural exodus to the urban areas by a newly created landless peasant class.

It was only after World War II that the Japanese Government adopted effective land reform measures like (1) fixation of rents (2) abolition of intermediaries, (3) controlling land prices, (4) transferring of ownership rights to the tenant farmers etc. The Government succeeded in abolishing intermediaries and transferring the lands to the tenants within a very short period. Hayami's work pointed that "for the four years from 1947 to 1950, the Government purchased 1.7 million hectares of farm land from landlords and transferred 1.9 million hectares including state owned land, to tenant farmers, which amounted to about 80 per cent of the ex-tenant land area. As a result, the ratio of farm land under tenancy declined from 45 per cent in 1945 to 9 per cent in 1955. Further, for remaining land under tenancy, the right of tenants was strengthened and rent was controlled at a very low level by the Agricultural Land Law (1952)." However, the farm-size distribution did not change, and the small scale family farm remained the basic unit of agricultural production.

The other factors underlying rapid agricultural growth in the post-world War-II period was the extensive use of industrial inputs, such as chemical pesticides, insecticides and tractors. Before World War-II, tractorisation in Japanese agriculture was limited. But a peculiar feature in the farm production after the war was the intensive use of mini-tractors. The number of hand tractors on farms rose sharply, from virtual non-existence in the 1940's to 89,000 in 1955, 5,17,000 in 1960 and 2,500,000 in 1965.\(^{10}\)

The following conclusions can be derived from the above analysis as regards the factors contributing to agricultural development in Japan. These include adoption and distribution of selective seeds, increased use of chemical fertilizers, use of pesticides on a large scale, rotational methods of crop production, improved agricultural practices (transplanting of rice plants) and education and extension facilities. The success in developing a technology consistent with resource endowments of Japan by improving indigenous "rono techniques" through the application of modern science is also one of the important factors responsible for the acceleration in the growth. The expansion of both local and international trade has brought about the transfer of land from low productive to high productive crops. It is interesting to note that the human capital is also greatly

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responsible for the development of agriculture. Japanese respect knowledge, and are lovers of hard work. Added to these, massive investment on social overheads were also partly responsible for the growth.

SECTION - II

Taiwan

In this section an attempt is made to analyse the major agricultural development programmes implemented by the policy makers of Taiwan between 1895 and 1979. Taiwan has a total area of 13,890 square miles, of which two-thirds is mountainous and only one-fourth is arable. The area fit for cultivation was around 8,70,000 hectares in the period 1952-53. Taiwan has achieved her economic development through strengthening her agricultural sector. According to Shih agriculture has been the main engine of Taiwan's economic development and has enjoyed remarkable economic progress. Even after 1960's the output growth rate is quite satisfactory. Chen and Wang study estimated that the annual average

output growth over the past seven decades, from 1913 to 1977 was 3.1 per cent. However, there were great fluctuations in the output growth rates during this period.

Agricultural output in Taiwan increased slowly before 1920's accelerated markedly up to 1939 and then declined sharply during World War II. The post war recovery was achieved by 1953 and since then the rate of growth in the output is quite satisfactory. Over a long period of 50 years, from 1910 to 1960, the average annual growth rate of agricultural output exceeded that of total population by a rather narrow margin and that of farm population by a great margin. Even after 1960's the output growth rate was quite satisfactory. In the first years of her agricultural development, extensive cultivation and then both extensive and intensive cultivation was practiced, whereas in recent years, it is exclusively intensive.

Development of agriculture had been initiated by the Japanese colonial Government shortly after Taiwan's annexation to Japan in 1895. It took interest and improved the economy's infrastructure between 1899 and 1905. In the year 1898, the agricultural research station was set up in Taipei. It carried on research into adoption of imported HYV seed variety to local conditions, research in the soil sciences, agronomy, plant pathology etc. All the research results and new technologies were transferred to rural areas through extension centres. Each district center/station was served
by a district association comprising of local personnel, officials, advanced farmers etc. Further, the Government also set up institutions like agriculture colleges, experimental stations, research sub-centres, agricultural departments etc. These departments undertook both basic and applied research in irrigation, crops, livestock production, forestry, fisheries, soil conservation and food processing. A number of technical innovations contributed to accelerating farm productivity and output, they include new crop varieties, irrigation, pesticides, chemical fertilizers, pest and insect control, livestock disease control, cultivation methods and practices, etc.

Greater attention was paid to irrigation only after 1920. Before 1920, new irrigation projects had not been initiated. Chen and Wang\(^{14}\) study clearly pointed out that the irrigated acreage greatly expanded in the 1930's with the completion of the huge Chianan Canal System. As a result, the proportion of irrigated area increased to 62 per cent of the total cultivated land. Further, it is stated that more than 60 per cent of the increase in output of paddy for the period between 1922 and 1938 could be attributed to the increase in the irrigated area. Irrigational facilities have thus played an important role in agricultural development in Taiwan.

The new variety of rice, 'IbruLai', of the Japanica type, was introduced in 1922. The area under this variety was considerably increased from 25,000 hectares in 1924 to 3,24,000 hectares (51 per cent of the total area planted to rice) in 1940. The new HYV seedlings were planted more closely than the earlier local varieties. The yield rates of the variety was also considerably high. Chen and Wang pointed that its unit yield was, on the average, 10.30 per cent higher than that of native variety.

The major change in the use of inputs was a marked increase in the chemical fertilizers. The consumption of fertilizers doubled between 1922 and 1938. Chen and Wang study clearly shows that the per hectare use of chemical fertilizers was 60 Kg. in 1911-15, increased to 420 Kg per hectare of crop area in 1946-50 and which further increased to 820 Kg per hectare of crop area in 1976-79. There was also considerable use of pesticides and better tools. The Government also succeeded in providing improved methods of storage facilities. The high overall growth rates were mainly due to the contribution of increased farm production and productivity.

The immediate post-war period was not favourable, and full of difficulties, for the farming communities. The departure of Japanese Civil Servants and Administration led to dislocation of extension services, transportation, banking and marketing institutions, servicing and research centres. The Chinese Government adopted various positive measures in 1950 to control inflation and to restore agricultural production.

Since 1953 the annual average growth rate of farm crops has been around 4.6 per cent which exceeded the country's annual rate of population expansion by about 1.0 per cent per annum. However, even after 1953, there were great fluctuations in the annual output growth rate. Chen and Wang§ study estimated that the average annual output growth rate for the period between 1951 to 1967 was 4.7 per cent and for the next period (1967-77) it was about 3.2 per cent per annum. This performance was achieved despite a decline in the average size of the family farm. Chen§ study reveals that the average farm size was 1.29 hectares in 1952, 1.02 hectares in 1972, and has remained around 1.02 to 1.06 hectares in recent years.

The sizeable growth rates recorded for the main crops in recent years were principally due to increase in the yield rates. The farming has recently begun to diversify significantly with the appearance of new crops such as banana, pineapple and mushroom which have become profitable. These crops have been adopted into the existing rotation system with the result that the production has become a mere continuous process.

The total use of chemical fertilizer has considerably increased from 3,00,000 metric tonnes in 1955 to about 7,67,000 metric tonnes in 1965 and it further increased to 1,300,000 metric tonnes in 1976-79. The fact that farming has become a continuous process has raised the level of output per unit of land. The adoption of improved variety of seeds with a greater drought resistance and a greater ability to withstand severe fluctuations in temperature has broadened the conditions under which production could take place. Further the percentage of farm implements have become significant since 1960. For example the power tillers, the most popular farm machines in Taiwan were increased from 3,708 in 1960 to 67,000 in 1979. The number of power rice transplanters which was only 280 in 1970 increased to 2,845 in 1979. Further the Government succeeded in providing easily available HYV seeds, fertilizers, new farming techniques, pesticides, etc.
The Government since World War-II has adopted the following policy measures: (i) Land Reforms, (ii) Agricultural Research and Technical Innovations, (iii) Farmers Organization and Agricultural Extension, (iv) Farm Credit, (v) Provision of Modern Inputs, (vi) Pricing of Farm Products, (vii) Promotion of Agricultural Marketing and (viii) Investment in Rural Infrastructure. As a result, agricultural productivity has increased substantially.

K.N. Raj has also pointed out various factors which were responsible for agricultural development in Taiwan. The relatively high rate of growth of agricultural output in Taiwan in the pre-war period was due to the extension of cultivated land area, this area having more than doubled between 1901 to 1940 (from 3,76,000 hectares to 8,60,000 hectares), but a significant part was also attributable to changes in technology. Higher yielding plant varieties, chemical fertilizers, and multiple cropping were introduced. But no changes were made in the land tenure system. The rapid growth of agricultural output after the second world war was due to technological changes. There was increase in the area under irrigation, extension of multiple cropping,

introduction of new and better plant varieties, and extensive use of chemical nutrients, implements and effective implementation of land reform measures.

Chen and Wang have summed up the factors which contributed to agricultural development particularly after 1951 as following: New and improved methods and techniques were developed and used. Modern inputs such as fertilizers materials and other chemicals became increasingly available, and small farmers made effective use of them with their surplus labour. Great technical advances boosted crop yields, and a better crop rotation system further increased the index of multiple cropping.

It is observed from the above discussion that the factors which contributed to the development of farm sector in Taiwan were extensive use of farm land, increased use of chemical fertilizers, adoption of new HYV strains like, "Ponlai paddy," and use of pesticides. The Government encouraged the multiple and rotational cropping through development of irrigational facilities. It has also extended research and extension facilities to the farming communities.

SECTION - III

Agricultural Development Programmes in India:

Agriculture forms the backbone of Indian Economy and despite concerted industrialisation in the last over three and a half decades, agriculture still occupies an important place. India, though a leading agricultural country, is not well placed in the matter of agricultural production and productivity. However, there is an increase in the area, output and yield rates of all crops, but there have been violent fluctuations in the output, yield rates etc, due to weather conditions and several other factors.

India is the second most populous country in the world and it occupies the seventh place in the world in terms of land area. Out of the total geographical area of 328.8 (1981) million hectares, net sown area forms 46.1 per cent (i.e., 140.3 million hectares), indicating that India has a high proportion of its land area under cultivation. The net area irrigated in the country as a whole was 38.3 million hectares in the year 1980-81. When compared to total area, nearly 73.0 per cent of the land under cultivation depends on monsoon, without assured irrigation facilities. The important crops in India are wheat, paddy, maize, millets, sugarcane, cotton, groundnut and pulses.
The trend in the relation of population growth to agricultural development has been moving in Malthusian fashion. During the period 1951-1981 population growth was 2.08 per cent per annum compared to 0.8 per cent per annum in the period 1901-1931. The average annual output of food grains and pulses remained almost constant during the period between 1901 and 1947. In the words of Thorner, "The trend in agricultural output over the last 60 years (i.e., till 1947) may be characterised as stagnation". But due to the advent of planning and intensive method of cultivation, an upward trend in output growth was initiated. The compound rate of growth of food grain production for the 30 years period between 1950-51 and 1980-81 had been 2.80 per cent per annum. But this growth rate has shown a declining trend from plan to plan. For instance, the compound growth rate of food grains production has fallen from 6.18 per cent in the first plan period (1951-56) to 3.4 per cent in the second plan period (1956-57) and to 2.26 per cent in the third plan period ending 1964-65. However, from the Fourth Five Year Plan onwards, there has been once again some increase in the annual output growth rate of food grains. It is also noticed that there has been an increasing trend of yield rates of some important crops. For example,

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in 1950-51 the yield per hectare of wheat was 660 Kg, which increased to 1,562 Kg in 1980-81. In case of paddy it increased from 668 Kg to 1,274 Kg during this period.

Though there has been some improvement in recent years, the conditions in agriculture have not changed much. It calls for appropriate measures for increasing agricultural output. It is argued that in the country, the scope for increasing production by additions to cultivated area is very much limited. Therefore, more reliance needs to be placed upon intensive cultivation. It is strongly argued that inputs like improved seeds, chemical fertilizers, irrigation, pesticides, credit etc., could yield significant results with the existing constraints in land use. Further, it is also argued that for getting good results it is necessary to devote greater attention to education, research, extension and institutional reform.

The use of output-enhancing inputs in the country is also not satisfactory. The total quantity of chemical fertilizers used amount to only 14.2 Kg per acre. As compared to other countries, it is very low. Nearly 27.4 per cent of the net cropped area is under irrigation. The area coverage under high yielding variety seeds is not so significant. There are various problems in the field of HYV seeds and a well organised seed industry is required. The relationship between research centre and extension facility is very weak and there is much communication gap between these two.
The era of planning in India started since 1950-51 with the launching of the First Five Year Plan in which top priority was given to agriculture. It has been a widely accepted view that the economic growth of a less developed country depends heavily upon improving the performance of the agricultural sector just as it happened in the case of the present day advanced countries during the earlier stages of their development. The Planning Commission was convinced that without a substantial increase in the farm production needed for industry, it would be impossible to sustain a higher tempo of industrial and economic development. Mellor strongly argued that India should lay special emphasis on agricultural development because of a high rate of population growth. The approach to agriculture in the First Five Year Plan was based on three broad ideas. These were: (i) increase in farm production could be achieved or obtained through increased use of inputs, particularly artificial application of water, (ii) the farm families were exploited by the landlords, zamindars, traders, middlemen and money lenders, and (iii) the low productivity in agriculture was due to lack of infrastructure facilities like education, extension etc.


Out of the total investment of Rs. 1,960 crores made in the First Five Year Plan Rs. 724 crores i.e., 37 per cent, was invested in agriculture. As a result of planning, 12 lakh acres of land were newly reclaimed and brought under cultivation. In total, as many as 14 million acres were brought under irrigation. A special campaign was started to propagate intensive cultivation of rice by the Japanese method of paddy cultivation. Nearly 40 per cent of the villages were brought under Community Development and National Extension Service. Legislations for abolition of intermediaries were passed. As a result of success in these programmes, the food production was considerably increased from 54.8 million tonnes in 1949-50 to 65.8 million tonnes in 1955-56.

However, in the sphere of production of commercial crops (cotton, jute and sugarcane), the output of these crops in 1955 was actually lower than the targets fixed for them. For jute, the target was 5.4 million bales but actual production in 1955-56 was 4.2 million bales. Sarma25 rightly observed in this connection that proper attention was not given to bring about the desirable change and improvement in technology. Thus apart from extending the irrigation facilities steps were taken for removing the institutional impediments to agricultural development through land

reforms, promotion of credit and marketing of co-operatives and launching of the community development programmes and extension services. In the field of abolition of Zamindari system the success was however partial. "The Government claimed that, by the end of the First Plan period intermediaries have been abolished..., but a few pockets remain where action is still needed." 26 Much of the additional farm production was achieved mainly due to the increase in the cultivated area rather than by increase in yields per acre. A vast expansion of irrigated acreage was a vital contribution to agricultural production. During the First Five Year Plan the progressive and better weather conditions increased the agricultural production. Nevertheless, the First Five Year Plan did not include measures for increasing the efficiency of Indian agriculture. Thus agriculture was not able to make a notable contribution towards absorbing increased population and raising incomes, or towards developing the non-agricultural sector. "Weather made the First Five Year Plan into a politician's temporary triumph and a planner's disaster." 27

In the Second Five Year Plan Period (1956-1961), highest priority was given to programmes of large scale

industrialization. For instance, out of a total expenditure of Rs. 4,672 crores, a sum of Rs. 979 crores was spent on agriculture. The plan aimed at a diversified agricultural economy including the development of animal husbandry and rural upliftment measures side by side with increased farm production. Attempts were made in providing irrigation facilities, chemical fertilizers, improved seeds and extension of the Japanese method of paddy cultivation. Towards the end of the Second Five Year Plan the Ford Foundation Team submitted its report and made many valuable suggestions relating to agricultural policy and programme. They were:

(i) due emphasis should be given to agricultural development and major time of village level workers should be devoted to agricultural development activities, and

(ii) due importance should be given to improved agricultural inputs and complementary relationship among all inputs of the development process.*

Further, on the basis of the recommendation of the Ford Foundation Team, Intensive Agricultural District Programme (IADF) popularly known as package programme was

* Ford Foundation Team Report, The recommendations of the Team have been summarised here. We have referred to the recommendations of the Team as per J.W.Mellor's presentation in his book quoted above, p.39.
introduced in seven districts. It aimed at an integrated and intensified approach to the problem of agricultural production in areas which were more responsive to such production efforts. The main objectives of the programmes were: (i) to develop package of practices in collaboration with the research resources; (ii) to find a way of substantial increase in the productivity of agricultural land and (iii) to identify the methods of effecting changes in the farmers' attitudes with a view to motivating them to adopt improved farm practices.

Food grain production increased from 65.8 million tonnes in 1955-56 to 79.7 million tonnes in 1960-61. The Second Plan merged the programmes of Community Development and National Extension Service into a single unified programme.

The Second Five Year Plan failed to recognise the importance of the agriculture sector. There was considerable decline in the allocation of capital to agriculture (in percentage terms) during this plan. The allocation for agriculture was only 20.9 per cent of total expenditure, compared to 37 per cent in the First Five Year Plan. Sarma\textsuperscript{28} rightly observed that the Second Five Year Plan did not even mention agriculture among the basic objectives of

development enunciated in Chapter II of the report. The Agricultural Programmes were envisaged as a mere carrying forward of the development started in the First Five Year Plan.

In 1959, the Ford Foundation Team criticised the agricultural policy adopted by the Indian Government under C.D.P. Agricultural development required a body of profitable technology specifically adopted to local conditions, but in large part such technology was not available in the early years of C.D.P. "In the early years no major effort was made to expand and rationalize the agricultural research system so that it would provide more profitable technology. Such an effort was postponed for ten to fifteen years".29 On the whole, the performance of agriculture during this plan was not satisfactory. Reforms on the institutional front were not only inadequate, they were ill-conceived as well. The targets regarding additional irrigation facilities, fertilizers, use of improved seeds etc., were not fulfilled.

The main aims of the Third Five Year Plan (1961-66) were achievement of self-sufficiency in foodgrains and increase in crop production. The Third Five Year Plan provided for an outlay of Rs. 1,281 crores on agriculture.

programmes. The actual expenditure under the plan amounted to Rs. 1,754 crores. The important programmes envisaged for increasing agricultural production were: (i) irrigation, (ii) supply of chemical fertilizers, (iii) distribution of improved seeds, (iv) soil conservation, (v) plant protection, (vi) better implements and (vii) adoption of improved agricultural practices.

In the Third Five Year Plan the old approach of C.D.P. was replaced by the new approach of the package programme based on the methods of intensive cultivation. The Intensive Agricultural District Programme was further extended to a large number of districts. Then the Intensive Agricultural Area Programme (IAAP) was launched in 1964-65 in 114 selected districts. The main aim of the programme was to bring about a progressive increase in the production of main crops in selected areas by an intensive "package approach".

The package programme was characterised by four major innovations. First, it emphasized measures for immediate increase in agricultural production. This approach represented a significant departure from the C.D.P. Secondly, consistent with this emphasis, the package programme purposefully chose for trial those districts which were most likely to respond to massive investment in agricultural production. This represented a shift from the egalitarian welfare emphasis of C.D.P. Thirdly, emphasis was directed towards
profitability at the farm level. Fourthly, emphasis was laid on supplying the physical inputs of production.

A major change occurred with the introduction of both IAAP and IADF in the country. Hybridisation techniques for maize and millets had been initiated as early as 1960. Hybrid seeds began to be widely used by 1963. In wheat, a beginning was made in 1963-64, when the Mexican dwarf variety were tried. Paddy seeds of exotic variety such as the 'Taichung Native-1' were introduced in 1965. However, the package programme failed in many respects. "... On the one hand it failed to set priorities and was excessively diffused and on the other hand it tended to ignore the problem of research and evaded the institutional and managerial aspects of water problem. The paucity of knowledge about handling and managing water under Indian conditions went unnoticed. The need for research on water use and management was great, but only towards the end of the Third Plan period recognition of this need begin to appear".  

The Third Five Year Plan was disastrously affected by bad weather. The drought of 1965-66 and 1966-67 with their grim threats of widespread malnutrition, even starvation, had an adverse effect on the attitude to planning. Not only this, the targets regarding provision of irrigation

facilities, land reforms, improved seeds, chemical fertilizers, soil conservation, etc., all remained unfulfilled. The plan had envisaged the provision of additional irrigation facilities on 52 lakh hectares of land. As against this, the achievement was only 22 lakh hectares. Further, minor irrigation schemes were neglected during this plan also.

During the Three Annual Plans (1966-69) the agriculture sector received highest priority. Expenditure on agriculture during the three annual plans amounted to Rs.1,578 crores. The Government, for the first time, accorded highest priority to the development of minor irrigation works. To boost agricultural production, the Government launched another programme, popularly known as 'Green Revolution' (GR) in the year 1966-68. The main features of the new strategy were: (i) cultivation of new high yielding variety seeds, (ii) development of irrigation for intensive cultivation, (iii) development of multiple cropping, (iv) application of scientific techniques, (v) adhering to soil and water management measures, (vi) using of package of practices including high yielding seeds, optimum quantities of fertilizers and pesticides, (vii) emphasis on research and its application, (viii) focus on farmers' training and education and (ix) development of infrastructure facilities.
Thus, the Green Revolution emphasised the need for the application of science and technological methods of production to agriculture. "The basic requirements for agricultural development in India, rich in labour but poor in land and capital, is technological change that increases yields through greater response to fertilizers and similar inputs of intensification. Because of sharp differences within agriculture, the new technology must be specific to the precise conditions of the area in which it is to be used - a requirement which calls for a widespread system of adoptive research and its necessary complement, basic research."

It is clear from the above discussion that the old approach of agricultural development based on the C.D.P. ideology of extensive method of cultivation failed to increase productivity and therefore the new approach of package programmes including IADA, IAAP and G.R., which were based on the ideology of intensive method of cultivation was adopted.

As a consequence of the adoption of the new agricultural strategy the consumption of chemical fertilizers increased from 7.69 lakh tonnes in 1965-66 to 17.6 lakh tonnes in 1968-69. The area under high yielding variety of

maize, wheat, paddy, jawar and bajra increased from 1.89 million hectares in 1965-66 to 9.20 million hectares in 1968-69. The new strategy helped in increasing agricultural production from 72.2 million tonnes in 1965-66 to 94.0 million tonnes in 1968-69.

Thus, the new strategy had paid immediate dividends in the form of higher average and total yields particularly in wheat. But the new strategy, as criticised by various scholars, could not cover all regions and all crops. And it had faced various difficulties. "There were other difficulties which were to be overcome before the new technology could be extended to paddy and millets and Green Revolution could not be an accomplished fact covering the entire rural scene. Firstly, over large areas where rice is grown under monsoon conditions there are the twin problems of inadequate drainage and pests and diseases, and appropriate crop varieties suited to each specific situation are to be evolved. Secondly, even the so called irrigated area does not necessarily imply adequate and timely irrigation. Thirdly, though the new technology is neutral to scale, the small farmers suffer from many disabilities such as the non-availability of credit and other resources for raising the yields". 32

The draft outline of the Fourth Five Year Plan (1969-74) contained a well conceived programme to accelerate the rate of agricultural growth. The plan had two main objectives in the agricultural sector: (1) "to provide the conditions necessary for a sustained increase in agricultural production by about 5 per cent per annum over the next decade, and (2) to enable as large section of the rural population as possible including the small cultivator, the farmer in dry areas and the agricultural labourer, to participate in development and share its benefits". 33

The Fourth Five Year Plan envisaged an expenditure of Rs. 3,674 crores on agriculture which was 23.3 per cent of the total expenditure of Rs. 15,779 crores. The Fourth Five Year Plan's agricultural development programmes and strategy were: (i) coordinated research in respect of all important crops, (ii) continued expansion of irrigation facilities and integrated use of ground surface water, (iii) improvement in the utilization of existing irrigation potential through special programmes: (iv) expansion in the supply of fertilizers, pesticides, equipments, implements and credit, (v) full exploitation of the possibilities of raising yields provided by the new seed variety in the case of cereals, (vi) to increase the yield levels of commercial crops,

33. Government of India, "Fourth Five Year Plan 1969-74" New Delhi, Planning Commission, 1969, p. 120.
(vii) measures to increase intensity of cropping and
(viii) improvement in the agricultural marketing system.

As a result of the implementation of various measures, consumption of fertilizers rose from 17.6 lakh tonnes in 1968-69 to 28.4 lakh tonnes in 1973-74. The area under high yielding variety seed increased from 9.20 million hectares to 26.04 million hectares during this period. The area development scheme were executed in different command areas for speedy agricultural development of areas covered by the respective irrigation projects. These facilities included storage, marketing, link roads, servicing, processing, etc. In order to achieve self-sufficiency in foodgrains, new technology and research was developed. For plant protection measures and prophylactic measures, separate Agricultural Aviation Directorate has been set up. Special programmes for protecting the interest of small farmers and marginal farmers like SFDA and MFAL were implemented. A National Commission on Agriculture was set up in 1970-71 to enquire into the problems and potential of Indian Agriculture.

The target for food grains was 129 million tonnes for 1973-74 but the actual production that year was only 103 million tonnes. However, the target of wheat was achieved whereas in case of other food crops the target was not achieved. The situation in pulses was highly distressing. Even in the case of commercial crops like cotton and jute,
actual production was much below the target level. As against the target of 80 lakh bales, the actual production of cotton in 1973-74 was only 54 lakh bales.

The unsatisfactory performance of the agriculture sector was mainly due to the failure in providing sufficient quantity of modern inputs. It was hoped that use of fertilizers would reach the target of 55 lakh tonnes in 1973-74, while the actual consumption was only 30 lakh tonnes. Targets of irrigational facilities could not be fulfilled. Mellor right pointed out that two deficiencies are however noted: (i) lack of a clear understanding and hence of a well developed policy for water and (ii) uncertainty about the role and the requirements of an effective extension service and lack of the facilities for creating one in a short period.

The Fifth Five Year Plan (1974-78) aimed at maximization of output growth in the farm sector and eradication of poverty in the country. Out of the actual expenditure of Rs. 39,426 crores a sum of Rs. 8,741 crores was spent on agriculture during this plan period. This accounted for about 22.1 per cent of the total expenditure. The plan targeted a growth rate of 3.5 per cent in food grains. For other crops, the growth rate of oil seeds was 5.0 per cent

and for sugarcane 3.2 per cent. For achieving the maximum crop production, the Fifth Five Year Plan envisaged the following strategy:35

(i) Intensification of problem-oriented research;

(ii) Strengthening of Agricultural extension and administration;

(iii) Expansion of the programme of multiplication and distribution of certified seeds;

(iv) Increase in the consumption of chemical fertilizers and improvement in the efficiency of fertilizer use;

(v) Water management;

(vi) Expansion in institutional credit;

(vii) Development of post-harvest facilities including expansion in the role of co-operative agencies in the marketing of crops;

(viii) Expansion of storage and marketing;

(ix) Effective operation of an agricultural price policy which provides requisite incentive for sustained and higher production; and

(x) Execution of land reform measures.

Due to these strategies, there was some increase in the use of modern inputs. The coverage under the high yielding variety seeds was extended to nearly 38 million hectares by 1977-78. Simultaneously, the irrigation potential was estimated to have gone up to 45.9 million hectares by 1977-78. A proportionately larger area was brought under irrigation in States which had relatively less irrigation. The achievement in respect of fertilizers consumption is even more significant. The total fertilizers consumption in 1977-78 was estimated to have exceeded 4.3 million tonnes as against 2.8 million tonnes in 1973-74.

With all these, the performance of agriculture was not satisfactory and there were wide fluctuations in agricultural production. Food grains production reached a level of 121 million tonnes in 1975-76 and decreased to 112 million tonnes during 1976-77. With better monsoon during 1977-78, it increased to 126 million tonnes. In case of jute, cotton and mesta, the yearly variations were considerable. The lack of stability in agricultural production was mainly due to non-availability of assured irrigational facilities. The relatively poor performance of agriculture during the Fifth Five Year Plan period was partly due to poor and unreliable weather conditions and partly due to planning failures.

The Sixth Five Year Plan gave great importance to agriculture and rural development. The plan provided an
outlay of 24,699 crores for the agricultural sector which formed 25.3 per cent of the total plan outlay. The plan had a target of 3 per cent growth rate per annum for foodgrain production. The aims of the agricultural programmes during the Sixth Five Year Plan period were: 36

(i) to consolidate the gains already achieved;

(ii) to accelerate the pace of implementation of land reforms and institution building for beneficiaries;

(iii) to extend the benefits of new technology to more farmers, cropping systems and regions and to promote greater farm management efficiency through concurrent attention to cash and non-cash inputs;

(iv) to make agricultural growth not only an instrument of maintaining an effective national food security system but also a catalyst of income and employment generation in the rural areas;

(v) to promote scientific land use patterns based on considerations of ecology, energy, conservation and employment generation; and

(vi) to safeguard the interest of both producers and consumers by attending to the needs of production, conservation, marketing and distribution in an integrated manner.

To achieve these objectives, the following measures were implemented:

(i) Strengthening of research work in the relatively less developed areas and to promote location-specific research;

(ii) introducing "training and visit system" of extension;

(iii) restoring the damage done to land due to all man-made processes;

(iv) providing opportunities for remunerative marketing of the farmers crops;

(v) introducing corrective measures and popularising the cultivation of pulses, oilseeds, and develop "pulses and oilseed crops villages";

(vi) protecting plants and producing and distributing quality seeds; and

(vii) stabilising prices of agricultural commodities by increasing their production.

During the Sixth Five Year Plan, one can thus easily see the shift of emphasis in agricultural policy and development programmes for strengthening the sector. The Government during this plan period intended to strengthen infrastructure facilities like, research, education, training, marketing etc., to the farmers. Efficient utilization of created water, distribution of quality inputs, land development and soil
conservation, dry land development technology etc., were other important measures implemented during the Sixth Five Year Plan for agricultural development.

SECTION - IV

Some Comparisons Between India and Other Countries:

The comparative picture of agricultural development programmes in some selected Asian Countries and India reveals the performance of the farm sector in their respective economies as summarised below:

(1) The consumption of chemical fertilizers in India is very low compared to other Asian countries. The consumption of chemical fertilizers per hectare increased from 37.89 kilograms to 200.79 kilograms and to 237.07 kilograms in Taiwan, from 53.63 kilograms to 139.78 kilograms to 167.53 kilograms in South Korea, while its increase was from 0.59 kilograms to 2.33 kilograms and to 4.43 kilograms only in India in the periods 1948-49 to 1952-53, 1960-61 and 1964-65 respectively. The per hectare consumption of chemical fertilizers in recent times is also very low in our country. The per hectare consumption in India is 32.2 Kg in 1980-81, in Japan, it is 425 Kg in 1973 and in Taiwan it is 820 Kg.

per hectare in 1976. Even the per hectare application of chemical fertilizers in China has considerably increased in recent years. The use of chemical fertilizers per hectare of cultivated acreage was only 0.73 Kgs in 1952 and 3.84 kilograms in 1957. By 1978, it had reached about 100 Kgs. 38

(2) For stimulating agricultural production and raising the living standards of agricultural families, prices of agricultural inputs should be fixed favourably relative to prices of agricultural outputs through proper price policies. This was done in Japan and Taiwan.

(3) Efficient infrastructure facilities like education, extension, training, marketing, financial institutions, transportation etc. were developed in Japan and Taiwan in the early years of agricultural development. In India, even to-day some of these are not developed on sound lines.

(4) The consumption of insecticides per hectare increased from 0.10 Kg to 19.48 Kg in Taiwan, while it increased from 0.06 Kg to only 0.29 Kg in India in the period 1955-56 to 1961-62.

(5) The development of irrigational facilities in our country is very low as compared to some of the Asian countries. In India, hardly 27.4 per cent of the net cropped area is

under irrigation whereas it is more than 60 per cent in Japan and Taiwan.

(6) The percentage increase in population between 1951 and 1964 was 57 in Taiwan, 35 in South Korea and 31 in India. The percentage growth in food production during the same period was 77 in Taiwan, 124 in South Korea and 45 in India.

(7) The performance in the yield rates of various crops is not satisfactory and it is very low in India as compared to some of the Asian Countries. On an average, the yields of rice and wheat per hectare were 2,210 Kg. and 960 Kg. in Taiwan, 2,750 Kg. and 880 Kg. in South Korea as against 668 Kg. and 660 Kg. in India in the period 1948-49 to 1952-53. Even in recent years these yields were very low in India. In the year 1974, for instance, the yield per hectare of paddy in India was 17.1 quintals and in Japan 58.3 quintals. Even at present, this picture has not changed appreciably.