Chapter Two

Review of Literature
Agricultural modernisation and rural development in India have got so intricately interwoven - both as programmes as well as processes - that it is rather difficult enough to see them as discrete parts. The enmeshing of the two has been so complete in terms of the reference to them in the plan documents from the time of the first five year plan that the two terms became almost synonymous; so much so agricultural development came to be identified by and by with respect to the development of rural areas. In more recent times, however, the term rural development has been given a meaning in a way that it goes beyond modernisation of agriculture.

With the above remarks in view, the survey of published literature in this report has been presented under the following broad head lines;

I. Rural Development in India - an overview
II. The place of agricultural development in Indian planning
III. Agricultural Modernisation and Development
IV. Current status of information with respect to crops selected for study
V. Training for Agricultural Modernisation
VI. Women and Agriculture
VII. Grass root level impact of training; the crux of the matter
I Rural development in India - An overview

a. Attempts in the pre-British period:

Because the villagers were self-contained, self-sufficient and self-governed units, there was little need for social welfare. The social system provided these in times of need. This was disturbed by the invasions of foreigners and Mughal rule when people felt the need for rural reconstruction work. The Panchayat system provided some of these facilities but the development of centralised seats of the government made these unimportant.(1)

b. Efforts by British Government:

Till the last quarter of the 19th century, nothing was done by these foreign rulers. But the series of famines, from 1875 to 1901, numbering 18 out of a total of 33 during the whole 19th century, forced the government to appoint some Commissions. They recommended rural development work. There followed certain acts like: Land Improvement Loans Act, and Agricultural Loans Act of 1888, Cooperative Act of 1904 and then the amendment in the Cooperative Act in 1912, establishment of development departments like Agriculture, Animal Husbandry and Veterinary, Irrigation, etc. Some irrigation projects were also taken up to control famines.

1 Sources relevant to this chapter are given in a serialised form at the end of the chapter
In 1935, the rural development work was transferred as a provincial subject and as a result of this, several provinces established their Rural Construction Departments or Village Uplift Boards. These departments started some rural development activities and obtained funds from the central government for this work.

But these development departments could not take up any comprehensive programme. Their activities were not based on detailed studies of programme planning, or the needs and resources of the people. It never emphasised the people's participation, cooperation and involvement. It never tried to create confidence in the people through an educational approach but mostly the work remained that of a supply agency and the approach of the extension agent was the approach of bosses and not guides, or teachers.

c. Work at Shantiniketan:

In 1908, Shri Rabindra Nath Tagore, under his scheme of rural development work, started youth organisations in the villages in the Kaligram Pargana of his Zamindari. He tried to create a class of functionary workers who could learn to identify themselves with the people. In 1921, established a Rural Reconstruction Institute at Shantiniketan. A group of eight villages was the centre of the programme. The activities of the institute were development of agriculture, cooperatives, industries and education through village organisations.
d. Gurgaon experiment:

Rural uplift movement on a mass scale was first started by Mr. F.L. Brayne, Deputy Commissioner in the Gurgaon district of the Punjab, adjacent to Delhi. Under his programme, a village guide was posted in each village who was to act as a channel through which the advice of experts in various departments could be passed on to the villagers. The programme of introducing improved seeds, implements, improved method of cultivation etc was started throughout the district. As these village guides were not technical men, very little of permanent value was achieved. The work again gathered momentum after 1933, when Mr. Brayne was appointed Commissioner of Rural Reconstruction in the Punjab. In 1935-36, the Government of India granted Rs. 1 or ore for distribution in various provinces for rural reconstruction work which acted as a stimulus. After that the work in the Punjab was transferred to the Cooperative Department and better living societies were organised to take up this work in villages.

e. Marthandam:

It was set up under the auspices of Y.M.C.A. (Young Men's Christian Association) in Travancore. It was intended to symbolise the three-fold development of spirit mind and body and evolved a five-sided programme, representing a development, not only spiritual, mental and physical, but also economic and social. The pioneer in this work was Dr. Spencer Hatch, an American agricultural expert. The essential technique of the centre was "self-help with intimate expert counsel". From the demonstration centre at Marthandam, about hundred villages were covered through Y.M.C.A. centres in villages. The extension secretary supervised the work.
Marthandam was in a strategic position to serve the villages. It kept prize bulls and goats, model bee-hives, demonstration plots for improving grain and vegetable seeds, poultry runs with prize laying-hens, a weaving shed, etc. Inside the centre, there was equipment like honey-extractors, health charts and the items needed for other cottage vocations. At the Centre, cottage vocations were taught and agricultural implements tested.

The emphasis throughout was on self-help and cooperation. The most successful projects was the Egg-Sdling Club. By 1939, the egg-selling cooperative society became a self-governing body. Another co-operative sodcty was the Honey dub, where the villagers were taught the use of modern bee-hives and extracted honey scientificaly. The honey brought by the villagers was cured and marketed cooperatively. There were Bull Clubs, Weavers’ Clubs etc. The Centre had extensive social activities which could meet the mental, physical and spiritual needs of the villagers. It arranged exhibitions, lectures and had a wide range of health programmes.

f. **Etawah Pilot Project:**

The idea of starting this project was conceived and born in 1947. It was put into action with headquarters at Mahewa village about 17 miles from Etawah(U.P) in September, 1948. First, 64 villages, which were then increased to 97, were covered under it LtCol. Albert Mayer of USA, who came to India with the American forces in 1944, was the originator of the Project
The Pilot Programme included introduction of improved agricultural and animal husbandry practices, public health education, literacy campaigns, improvement of cottage industries, training in repairing and evolving simple agricultural implements, in short a general awakening of all-round village uplift activity so that the Panchayats get on a sounder footing.(3)

The most effective achievement was that the entire area was under improved wheat crops. The area under vegetables was extended and diseases like Rinderpest and Haemorrhagic Septicaemia controlled. The other programmes taken on were the construction of roads, soak pits, adoption of improved agricultural practices, etc. All these resulted in improving the economic conditions of the villagers.

a. Adansh Sewa Sanah. Pohrl (Gwallor):

This plan of rural reconstruction was put into operation in 232 villages, falling in the Jagirdari of CoL Shitole. It aimed at increasing the per capita income of villagers. In each village, a Village Reconstruction Society was formed and the important items of work were compost making, deep ploughing, improved breeding and management of cattle, etc. The Sangh published a monthly journal "Rural India" which was devoted to Planning and Community Projects.

b. I.V.S. (Indian Village Service):

Its founder was Mr. Arther T. Mosher of New York, and Shri B.N. Gupta who established it in 1945. The objectives of this organisation were to assist village people to realise the best in their own villages by developing individuals, volunteer
leaders and local agendes and enabling them to be effective in helping themselves and others. The object was to assist the Government in developing villages.

For the realisation of the above objectives, the organisation adopted techniques like personal contacts, informal group discussions, use of volunteer, demonstrations, use and production of visual aids, exhibitions, tours and trips, dramas, books and periodicals etc. It was financially supported by contributions and donations. The organisation had branches in Lucknow and Etawah (U.P.) and was affiliated to the Presbyterian Church in the USA. Residents of 15 villages were the beneficiaries of this organisation.

k. Sarvodaya Programme:

It was a Gandhian concept and evoked great enthusiasm in Bombay State. The main features were simplicity, non-violence, sanctity of labour and reconstruction of human values. It aimed at raising the standard of living, scientific development of agriculture, promotion of cottage industries, spread of literacy, and health radii ties and the development of Village Panchayat.

i. Firka Development Scheme of Madras State:

It was Government-sponsored and aimed at the attainment of the Gandhian ideal of Gram Swaraj by bringing about not only educational, economic, sanitary and other improvements in villages, but also by making the people self-confident. The scheme was launched in the last quarter of 1946 in 34 Firkas throughout the State; and on April 1, 1950, it was extended to another 50 additional Firkas, at the rate of two Firkas for each district. The selection of the Firkas was based on considerations.
of the general backwardness of the area and the possibilities for initiating the production of handloom cloth and other cottage industries.

The scheme, which aimed at attacking the rural problems as a whole, as well as in parts, consisted of short-term plans for the development of rural communications, water supply, formation of Panchayats, organisation of cooperatives and programmes for sanitation, as also long-term plans to make the area self-sufficient through agricultural, irrigational and livestock improvements, and the development of Khadi (hand-made doth) and other Cottage Industries.

The Collector, who was primarily responsible for the successful working of the scheme in the district, was assisted by a rural welfare officer of the rank of Naib Tehsildar, who was put in charge of 2-3 selected Rrkas. Each FIrka was divided into 5 to 10 groups of villages which were put in the charge of Gram Sewaks who were of the rank of Revenue Inspectors.

Each FIrka or group of Rrkas was provided with special staff like agricultural fiddmen, administrative officers, Mistries, P.W.D. Supervisors and minor irrigation overseers. To associate the people with the implementation of the programme, Development Committees, consisting of offldals and non-offldals, were constituted in each Rrka. At the State level, there was a State Rural Wdfare Board comprising the heads of the Departments and influential and constructive sodal workers. It was this Board that drew up the comprehensive plan of Rrka Devdopmcnt in October, 1947.
In order to effectively stimulate healthy competition between the official and non-offidal, the Government of Madras dedded to entrust the development schemes to non-offidal agendes engaged in doing constructive work. Five non-offidal agendes were actually selected and paid grants for doing Fira development of.

1. Rural Reconstruction
2. Drinking water faalities
3. Sanitation
4. Agriculture and
5. Khadi and other village industries.

It was later realised that these efforts were restricted in scope and lacked coordination. They proved Ineefective owing largely to lack of direction, support and encouragement from the central authority.

m. Nilokhert Experiment*

It was originally started to rehabilitate 7000 displaced persons from Pakistan and later integrated with the 100 surrounding villages into what came to be a rural-cum-urban township. It was built round the vocational training centre that was transferred from Kurukshetra, in Jury, 1948 to the 1100 acres of swampy land on the Delhi-Ambala highway.

The central figure of this Project was Shri S.K. Dey, later Union Minister for Cornmunity Devdopment and Cooperatives up to 1965. The scheme called "Mazdoor Manzll" aimed at sdf-suffidency for the rural- cum-urban township in all
the essential requirements of life. The colony had school, an agricultural farm, polytechnic training centre, dairy, poultry farm, piggery farm, horticulture garden, printing press, garment factory, engineering workshop, soap factory etc

**n. Royal Commission on Agriculture:**

The Royal commission on Agriculture observed in its report "the welfare and prosperity of rural population will not come by technical advancement alone. If it is not true that better living could be secured only by a combination of better farming and better business, it is equally true, that the will to live better must be furnish the driving force, that is required at the heart of the problem and development of the desire for a higher standard of living.

A vague aspiration now exists and always lias existed, but it is rendered ineffective by an inhibition which has to be taken up before large scale progress is possible".(S) The commission in 1926, had commended the system of village guides devised by Mr. Drayne in his Gurgaon experiment

**o. Extension Service:**

The Greatest Need. The fiscal commission, set up by the government of India had observed in 1949. "An over view the greatest need at present in India is a Extension service with the object of bridging the gap between research and the practices of produces, similar to those which have been found to valuable in U.K., USA etc. What we have In mind is an extension officer with the necessary staff for a group of 40 or 50 villages working on a demonstration farm. The officer will be the
agent of the schemes of improvement for the villages in the centre and the guide and friend of the farmers in the area and in close contact with them.

p. Community Development Programme:

The Community Development programme was started on 2 October 195Z, the birthday of Mahatma Gandhi. The Community Development programme was also eulogised as the "Magna Carta of hope and happiness" for rural India. It was indeed an "Epic in Action".

Rural reconstruction and People's participation have been the twins objectives of Independent India to achieve rural upliftment(T) community Development Programme was started to realise these objectives. The basic principle of the programme was first enunciated by the Planning Commission in the First Five Year Plan. In the words of the Planning Commission "Community Development is the method and Rural Extension agency through which the Five Year Plan sought to initiate a process of transformation of the social and economic life of the villages".

Chief Characteristics:
The Chief Characteristics of the Community Development Programmes are:

1. It is a multi purpose integrated plan of rural reconstruction. It is concerned with the social, economic, cultural and recreational aspects of rural life:

2. It is organic in character, that is, the programme will strike roots in the rural areas and grow with local support
3. It lays emphasis on the economic improvement of the villagers. The main thrust is on increased agricultural production and development of allied small scale industries and crafts; and

4. It is comprehensive in the sense that it provides the ideology and the method to achieve economic development, social change and democratic growth.

The Community Development Programme was started as an experiment. Initially, 55 Community Projects were started all over the country. A community project normally covered 300 villages with a population of 3 lakhs and with a budget of Rs.65 lakhs. The community projects were to function for 3 years. Later, the size of the Community Projects was reduced. The Community Development Blocks were created in selected areas. Each Block was to have a population of 65 thousand and with a budget of Rs. 15 lakhs for a 3 year period.

4. National Extension Service:

The National Extension Service was a equal to Community development Programme. It was organised with a view to;

a) spread the ideology of community Development among the villagers
b) teach them the modern methods of agriculture and allied fields; and
c) secure their cooperation to the development programmes.

The intention was to transform the status-quo administration into a welfare agency. In other words, the National Extension Service was to be the administrative vehicle through which the Community Development Programme would be carried out
II Place of Agricultural development in Indian planning

a. Agriculture In the first plan:

The First Plan was launched with two-fold objectives, viz., to correct the disequilibrium in the economy and to initiate simultaneously a process of all round balanced development which would ensure a rising national income and a steady improvement in living standards.

Agriculture, inducting irrigation and power, was given the topmost priority in the Plan because without a substantial increase in the production of food and basic raw materials for industry, it would be impossible to sustain a higher tempo of industrial development. Accordingly, out of a total outlay of Rs. 1960 crores were earmarked for agricultural and community development (i.e., 14.8 per cent of the total outlay) Rs. 310 crores for major and medium irrigation (i.e., 16 per cent), and Rs. 260 crores for power development (i.e., 13 per cent).

The First Five Year Plan laid special emphasis on agricultural development it envisaged the following increases in agricultural production. It was proposed in the Plan to increase the production of food grains from 54 million tons to 62.59 million tons; of oilseeds from 5.16 million tons to 5.57 million tons; of cotton from 2.87 million bales to 4.21 million bales; of jute from 3.3 million bales to 5.4 million bales and of sugarcane from 5.7 million tons to 6.4 million tons during the plan period. For this purpose about 16 per cent of the expenditure in the Plan was earmarked for agriculture and community development projects and another 17 per cent for
multipurpose irrigation projects. The three remarkable features about agricultural planning in the First Plan were:

1. The work was to be organised entirely by the State Governments. They were to manage the irrigation and power projects and the Central Government was to coordinate the work and to give general assistance.

2. The main emphasis was on long-term projects, the full advantage of this planning was to be felt after a period of 15 to 20 years when Indian agriculture will come to its highest development.

3. The object of the plan was not only to increase agricultural production but to bring about an all-round development in rural life.

The success achieved during the First Plan even exceeded the targets. The index number of agricultural production increased from 95.6 in 1950-51 to 114.3 in 1953-54 and 116.8 in 1955-56. The targets of production set out in the plan were exceeded in the case of food grains (69 m.tons) and oilseeds (6.2 m.tons) in 1953-54; while in the case of cotton, the target was exceeded in 1954-55. In the case of jute and sugarcane, production had gone down in 1952-53 and 1953-54 but there was a remarkable recovery in their production in 1954-55 and 1955-56. Sugar production reached the record figure of 15.9 lakh tons in 1954-56 we manufactured 8.7 lakh tons.

b. Agriculture under the second plan (1956-61)

At the end of the First Plan, the country appeared to be out of the woods. Against this background the Second Plan was drawn up to meet the increasing
demand for food and raw materials on account of growing population and expanding industries. The target of foodgrains production was put at 15.5 million tons, that is an increase of 24 per cent over the estimated production for 1955-56.

The production of oilseeds, sugarcane, cotton and jute was expected to go up by 38, 35, 56 and 58 percent respectively while agricultural production as a whole represented an overall increase of 27 percent. The higher production was envisaged to be achieved largely through improved techniques and propagation of intensive cultivation. But unlike the First Plan, in which emphasis was primarily laid on crop production, the Second Plan aimed at a diversified agricultural economy as it included development of livestock and rural uplift measures side by side with increased crop production. In the programme for improved techniques and the spread of intensive cultivation, important items were better irrigation facilities, greater use of manures and fertilizers; more widespread distribution of good seeds; and extension of the Japanese method of Paddy cultivation. (2) As against Rs. 1,504 crores which were allotted for agriculture, the actual amount spent was Rs. 950 crores. Rs. 530 crores were devoted to agriculture and community development programme and Rs. 420 crores to major and minor irrigation. This accounted for about 20 percent of the total outlay as against 31 percent in the First Plan. The tempo of agricultural development was accelerated during the plan period, resulting in an increase in production by 19 per cent. Food grains output increased by about 13 million tons, (though the target was 15.5 million tons) -the rate of increase being about 4% per year.
c. Agriculture under the third plan (1961-66)

The Planning Commission observed: "In the scheme of development during the Third Plan the first priority necessarily belongs to agriculture. The experience in the first two plans has shown that the growth of rate in agricultural production is one of the main limiting factors in the progress of Indian economy. Agricultural production has, therefore, to be increased to largest possible extent feasible. Both in formulating and implementing programmes for the development of agriculture and the rural economy during the Third Plan, the guiding consideration is that whatever is physically practicable should be financially possible and the potential of each area should be developed to the most extent possible".

The Third Plan provided for an outlay on agricultural programmes including large and small irrigation schemes, soil conservation and cooperation, of about Rs.1281 crores, comparable outlay in the Second Plan being of the order of about Rs.667 crores. The programmes aimed at nearly doubling the rate of growth of agricultural production. The Plan set two specific priority goals to be reached, viz.,

(i) to produce enough food grains to be self-sufficient and
(ii) to produce enough commercial crops to meet the needs of exports and industry.

With these goals in mind, a target of stepping up agricultural production as a whole by 30 per cent was set. Food grains production was to be increased by about 32 per cent, of rice by 41 percent, of wheat 50 percent and of pulses 42 per cent. That of commercial crops, the targets of increase were set as 38 per cent for Oilseeds, 25 per cent for sugarcane, 37 per cent for cotton and 55 per cent for jute. These targets called for substantial increase in crop yields per acre-these were
expected to be 27 per cent increase in the case of rice, 20 percent for wheat, 16 percent jute, 14 percent for cotton, 11 percent for oilseeds and 18 percent for sugarcane. (3)

The best year of the Third Plan, from the point of view of agricultural output, was 1964-65. During the first four years of this plan, the average increase in agricultural output worked out to be 26%. As a result of the drought conditions in 1965-66, agricultural production was adversely affected. The decline of 17% in agricultural production in 1965-66, was unprecedented and thus the target of 100m. tonnes could not be realised. The index number of food-grains resulted in imports worth Rs. 1,100 crores between 1961-62 and 1965-66; the food grains production having fallen from 82.71 m. tonnes in 1961-62 to 72.3 m. tonnes in 1965-66.

d. Agriculture and the fourth plan (1969-74)

The Fourth Plan had two main objectives in the agricultural sector. The first aimed at a growth of about 5 per cent per annum over the next decade. The second objective was to enable as a 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. Accordingly the priority programmes fell into two categories, namely those which aimed at maximising production and those which aimed at remedying imbalances. The consumption of fertilizers was to be more than three times the 1968-69 consumption level. Plant protection measures were to be provided to 80 m. hectares of land. Soil conservation measures were to be undertaken on 5.39 m. hectares of
agricultural land and 0.45 m. hectares of non-agricultural land. About 1 m. hectares of land was to be readied. Dairy farming was to be undertaken, in 128 districts with the help of a new package of technology. This was to include soil management, harvesting of water to conserve moisture derived from monsoon, introducing of new short duration crop varieties and new agronomic practices. (4)

Ten area development schemes were executed in different command areas for speedy agricultural development of areas covered by the respective irrigation projects. The facilities included marketing complexes and certain ancillary facilities such as link roads and storage facilities to make optimum use of water, custom service for agricultural operations and processing facilities.

Certain distinct trends have been visible in the progress of agriculture since 1969-70. These relate to some important policy measures and programme steps taken up by the Union Government Department of Agriculture. These are:

1. A programme has been launched for both small and marginal farmers and for dry and chronically drought affected areas and for rural employment costing nearly Rs. 385 crores during 1971-72 to 1973-74.

2. In order to achieve self-sufficiency in matters of food grains and other crops, new technology and research was developed. A breakthrough in rice had been achieved and further efforts are under way in regard to pulses, oilseeds and some other cash crops.
3. The third important development is the trend towards systematisation and extension of water management and ground water exploration programme. This is being done by the Central Water Board with a view to reduce country's dependence upon the vagaries of the monsoon and to optimise the use of available water in the country.

4. For plant protection and prophylactic measures, a separate Agriculture Aviation Directorate has been set up and Surveillance Team formed.

A National Commission on Agriculture was set up in 1970-71 to enquire into the progress, problems and potential of Indian agriculture. The commission was asked to examine comprehensively the current progress of agriculture in India and to make recommendations for its improvements and modernisation with a view to promoting the welfare and prosperity of the people. It has produced 22 Interim Reports by March 1975.

The Fourth Plan assumed a production level of 98 lakh tonnes in the base year and target was put at 129 m. tonnes, but actual production of food grains in 1968-69 turned out to be lower by about 4 m. tonnes. As regards the production level in 1973-74 the total for the country may reach 114 m. tonnes.

e. Agriculture under the fifth plan (1974 - 79)

The Fifth Five Year Plan was formulated at a time when the economy was facing severe inflationary pressures. The major objectives of the Plan were to achieve self-reliance and to adopt measures for raising the consumption standards of the people living below the poverty line. The Plan also gave high priority to
bringing inflation under control through appropriate fiscal and monetary policies. The Fifth Five Year Plan targeted an annual growth rate of 5.5 per cent in national income. It provided Rs.8,528 crores for agricultural development and irrigation, i.e., 20.5 per cent of the total plan outlay.

The Fourth Plan was more articulate about the need for special efforts to alter the skewed pattern of income distribution and provided for separate schemes for the development of backward areas and the weaker sections. In the Fifth Plan adopted the strategy of agricultural production of the previous Plan based eminently on the exploitation of the high yielding varieties of cereals and multicropping, after some modifications. Water management mainly in the irrigation commands of the major and medium irrigation projects in the country, created difficulties in Kharif production, particularly rice. A large programme of integrated development of irrigation commands in 50 major irrigation projects covering 14 million hectares was put through in the Fifth Plan. This could help not only the rice programme but also the multicropping programme with special emphasis on the cash crops particularly oilseeds and pulses which were in serious short supply. The small farmers and marginal farmers schemes would have large programme of local construction mainly in earth-work, thereby giving employment to a large labour population in the off season. In addition, the growth in the agricultural sector was expected to generate more employment opportunities through intensive Farming in the command area. Besides, research work on seed technology, a substantial programme for development of local manural resources and strengthening of distribution arrangements for chemical fertilizers were some of the salient features of agriculture development in the Fifth Five Year Plan.
f. Agriculture under the sixth five year plan (1980-85)

The Sixth Five Year Plan aims at a compound annual growth rate of 3.83 per cent in the gross value added in agriculture and over 5 per cent per annum in value of gross output. To achieve these goals and the stated Plan objectives, the main strategy for crop production during the Sixth Plan period is based on a steady growth of foodgrains production, substantial increase in pulses production, self-sufficiency in oilseeds and increased production of export oriented crops like tea, tobacco, spices,(6) etc. Inter alia the aims of the agricultural programmes during the Sixth Plan period was:

1. to consolidate the gains already achieved;
2. 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;
3. to make agricultural growth not only as an instrument of maintaining an effective national food security system but also a catalyst of income and employment generation in rural areas;
4. to safeguard the interests of both producers and consumers by attending to the needs of production, conservation, marketing and distribution in an integrated manner.

Agricultural production requires a variety of inputs and services for sustaining and expanding production - fertilisers and manures, improved seeds, plant protection, chemicals and modern implements.
Agricultural production during 1967-68 to 1978-79 has grown at an annual compound rate of 2.8 per cent, whereas in order to achieve an overall annual growth rate of the economy around 5.2 per cent during the sixth five year plan, it is crucial that annual rate of growth of production, which will vary for different crops, should be in the range of 4-5 per cent on the trend base in 1979-80.

g. Agricultural sector in seventh five year plan (1985-90)

Agricultural growth during the Sixth Plan was broadly as anticipated and production targets were by and large achieved for foodgrains and oilseeds. The output of foodgrains which was 132 million tones in 1978-79 rose significantly to 151.5 million tonnes in 1983-84. This has been made possible by increased use of new inputs like fertilizers, pesticides and much more area under irrigation and high yielding varieties of seeds. However, while the agricultural sector has evinced growth potential during the planning era, its growth and development has not been uniform all over the country and among different groups of farmers.

The development strategy of the Seventh Plan aims at a direct attack on the problems of poverty, unemployment and regional imbalances. The growth rate of agricultural output is expected to be around 4 percent. This is consistent with the growth in consumption brought about by income growth and by emphasis on the removal of poverty and unemployment. Since by the turn of the century the total population of the country is expected to be 972 millions. The perspective plan for agricultural development aims at maintaining self-sufficiency in food grains, pulses, oilseeds and fibres. Out of total public sector outlay of Rs. 1,80,000 crores, the allocation on agriculture including rural development, irrigation, etc. is
The seventh Plan aims at a substantial increase in agricultural production with a targeted growth rate of 4 percent per annum. Agricultural growth is a crucial element in the strategy to tackle the problem of poverty and unemployment. Accordingly the seventh plan envisaged that a substantial part of the additional production would come from small and marginal farmers and from dryland areas. In order to attain the growth pattern envisaged, following special efforts were recommended. The seventh plan envisaged the distribution of certified qualify seeds going up from an assumed base level of 7.04 million quintals in 1984-85 to 11.74 million quintals in 1989-90.

The total irrigation potential was 67.9 million hectares by the year 1984-85 as against total potential of 113 million hectares. The seventh plan envisages creation of additional potential of 12.9 million hectares. The total irrigated area achievement thus is projected at 80.8 million hectares potential and at 71.4 million hectares utilisation has to increase at 2.44 million hectare per annum during the remaining three years. The seventh plan target for consumption of chemical fertilizers have been kept progressively increasing from 9.55 million tonnes in the first year to 14.0 million tonnes in 1989-90. As against this the actual consumption during the first two years has been short of the target, because of the scanty monsoons, thus emphasising the need for additional irrigation.

Seventh Plan recognised the need to widen the spread of agricultural growth. Towards this even a special emphasis was placed on the following
programmes. These programmes were started at the beginning of the seventh plan:

1. Special Rice Production Programme in the Eastern Region (SRPP)
2. National Oilseeds Development Projects (NODP)
4. Scheme for Assistance to small and marginal Farmers for increasing Agricultural Production (ASMF).

**h. Agriculture under the Eighth Five year Plan (1992-97)**

The public sector outlay on agriculture and irrigation which was of the order of Rs.25,000 crores in the Sixth Plan, rose to Rs.40,000 crores in the Seventh Plan and was projected to rise to Rs.93,680 crores during the Eighth Plan (1992-97) at 1991-92 prices. The outlay on agriculture and irrigation was 22 per cent of the total plan outlay in the Eighth Plan. Curiously, public sector outlay on agriculture and allied activities has been around 22 to 23 per cent in the several earlier five year Plans as well.

The basic aim of the Eighth Plan in the sphere of agriculture and irrigation, is the same as in previous plans, viz., to consolidate the gains already achieved in agricultural productivity and production during the last 40 years, sustain productivity and production to meet increasing demands of the growing population, to enlarge the income of the farmers, create more employment opportunities and step up agricultural exports.
Since the ushering of the green revolution in the mid-1960's, the Planning commission has been aware of the painful fact that the growth rate in agricultural production is highly skewed in terms of geographic areas as amongst crops. For instance, rapid improvement in productivity and production of a few of the agricultural crops as a result of the introduction of high-yielding varieties technology since the mid-sixties, has been conspicuous only in small pockets of well-irrigated areas. Accordingly, the Eighth Plan would like to follow the following strategy.

(i) The Eighth Plan would concentrate effort on Eastern India (in the heavy rainfall region), the vast rainfed tracts in the country and the hilly regions and help these areas to adopt the new technologies so as to achieve high agricultural growth rates. The basic Plan effort is to intensify the initiatives already taken in the Sixth and Seventh Plan to increase productivity and production of principal crops in those areas which have relatively lower growth.

(ii) The Eighth Plan would initiate programmes to enable farmers in the rain-fed areas to make scientific and optimum use of their land and water resources. At the same time, the treatment of rain-fed areas on water-shed basis will create employment opportunities for unskilled labour by way of developing the potential of drylands, construction of water harvesting structures, plantation of horticulture, agro-forestry etc. This will help to tackle the problem of rural unemployment and under-employment in areas with poor growth in agriculture.

(iii) The Eighth Plan will concentrate its attention on the small and marginal farmers who have small sized land holdings and whose incomes were inadequate to support a minimal standard of living. The eighth plan would help to diversify agricultural production system in to other allied activities, capable of generating
higher incomes such as animal husbandry, horticulture, sericulture, fisheries, agro-
forestry, etc.

(iv) the eighth plan emphasises:

(a) The strengthening of market infrastructure to realise a fair share of the price paid by the consumers;

(b) the expansion of agro-based industries particularly the processing units, so as to increase the income of the primary producer and also to create jobs for the educated, skilled and unskilled workers in the rural area; and

(c) maximising the production of the traditional commodities of export and also the production of non-traditional items like flowers, fruits etc. for export purposes. In general, the eighth plan attempts to promote to private initiatives, participation of non-governmental organisations (NGO's) and the Panchayati Raj institution in socio-economic development in rural areas.

The Eighth Plan had fixed steep targets in different crops which would call for much higher efforts than in the previous plans. The targets of agricultural production indicated a growth rate of 4.1 per cent per annum over the assumed base level of 1991-92.

Many of the important programmes to maximise production of several crops are to be continued during the Eighth Plan period. These include special food grains programme in respect of rice, wheat, coarse cereals etc. and also programmes like the oilseeds, pulses, cotton development etc.
The re-orientation of agricultural and rural development programmes in the Eighth Plan attempts to promote a regionally more broad-based pattern of agricultural growth, that is, ending the neglect of vast rainfed and dryland areas. There is considerable emphasis on watershed development programmes in rainFed tracts which constitute 70 per cent of the country's cultivated area. The Eighth plan attempts to make much more effective use of irrigation facilities, both existing and newly created, as well as other farm inputs so that the full potentialities for yield improvement can be achieved, specially in the rainfed tracts.

During the Eighth Plan, a major effort will be made to restore and improve minor irrigation works. Measures to improve quality of water management, including more active farmers' participation, will be intensified. The Eighth Plan proposes to improve the delivery systems for farm inputs including credit. The Eighth Plan appreciates the need to strengthen and streamline the agricultural credit system so that the farmers can get adequate credit and at reasonable rates of interest. The Eighth plan gives attention to the diversification of agriculture into higher value-adding and more remunerative enterprises such as horticulture, sericulture, dairying, animal husbandry etc. and also at strengthening marketing and agro-processing facilities.

The Eighth Plan is basically sound in its approach, strategy of development and the targets of agricultural crops fixed. Much, of course, will depend upon the weather and climatic conditions.
The Government of India placed a Draft Agricultural Policy Resolution in the Parliament in December 1992 embodying the basic objectives and strategy of agricultural development of the Eighth Plan. The Draft Resolution on agricultural policy expects agricultural development and research programmes to meet the challenges of Indian agriculture. The Draft Agricultural Policy Resolution focusses attention on the problems of rural unemployment, under-employment and malnutrition and seeks to solve them through diversification of agriculture and promotion of agro-based industry. Other major objectives of the Draft Agricultural Policy Resolution—as also of the Eighth plan are: augmenting facilities for processing, marketing and storage, development of rainfed and irrigated horticulture, increase in bio-mass production and better utilisation of irrigation potential and promotion of water conservation. The draft policy also aims at strengthening the cooperatives and local communities and increasing the involvement of non-governmental organisations in agricultural development.

All these steps will ultimately end up in diverting resources to the richer farmers as has been happening in the last three decades, even though on paper. The various programmes are supposed to promote agricultural growth in less developed and rainfed areas and help the small and marginal farmers.
III Agricultural Modernisation and Development

What is Agricultural Technology?

There are a vast number of studies on socio-economic implications of the new agricultural technology specially mechanisation and use of biological-chemical technologies (e.g. improved seed, inorganic fertilizers, herbicides and insecticides, etc.) Relative issues which appear to be relevant on this aspect are discussed here in brief.

a. Cropping pattern:

Cropping pattern is the yearly sequence and spatial arrangement of crops. To achieve higher efficiency in agricultural land use, the multiple cropping system is being followed widely in the country which is based on three concepts: first, the expansion of the crop area; second, the improvement of the yield of individual crop; and third, the time dimension. In the given season the crop area as well as the yield of individual crop may be maximised. The number of days within which the crop matures may be minimised. This has led to the shift from subsistence food crops to commercial cash crops. Such effects are not purely related only to differences in labour use patterns but also affect the nutritional status of women and children in household. The spread of short duration high yielding varieties at the cost of acreage and production of pulses, a principal source of protein becomes a matter of serious concerned.
b. **New varieties:**

Introduction and use of short duration varieties offer not only the prospects of higher yields but greater crop intensification. Undoubtedly much of the intensification has taken place in irrigated area. One would expect the introduction of HYV’s of rice to increase the overall requirement of labour in the field relative to the traditional varieties. The increase in labour use has been associated with half care-of-crop activities. Secondly, more labour would be needed for harvesting and threshing. Thirdly, many new varieties of rice is of short duration. This would enable the farmer to increase cropping intensity orienting to labour using area.(2) Thus, the introduction of HYV of paddy increases the requirements of labour because of peak labour needs for sowing/transplanting, interculture and harvesting. These are the operations in which female labour is primarily used, one can expect an increase in the use of female casually hired with three HYVs.

c. **Intensive cultivation and farm size:**

Farm size has been noted to be relatively negative to total labour use in general and family labour in particular, but related positively to hired labour use. In other words, many of the effects of farm size and intensive cultivation with HYVs adoption would tend to lie in opposite directions. Taking into account the farm size is also interest in the instance of farm women labour since size would be a broad proxy for the family's socio-economic status.

d. **Irrigation:**

In the country the net irrigated area has increased to 39.97% (1982-83) from 20.85% (1950-51). Thus, the impact of irrigation may usually be expected to lie in
the same direction as that of HYVs. This is because certain crops are more labour intensive than others and likely to use more of certain types of labour than others.

e. Mechanization in agriculture:

Several studies have pointed out that mechanization in agriculture is found mainly in men's work. Women's work (including household tasks) has remained predominantly manual. It would appear that certain technological choices are not only labour specific in that they might be use or dispense with units of labour, but that they were female-labour-specific in that they absorb male labour and at the same time disemploy female labour. This generalisation appeals to apply to many agricultural tasks such as weeding, harvesting and carrying operations and to a wide range of non-farm activities.

f. Chemical fertilizers:

Men and women share equally in the traditional use, preparation and application of manure but in the application of chemical fertilizers men undertake the task rather than women. Further, rising labour cost in some parts of the state have led to adoption of more fertilizers and reduction in the interculture.(3)

g. Herbicides:

ICRISAT research has indicated the adverse effects of herbicide based weed management on employment. Women, who are often at risk nutritionally and who are the principal labour for weeding are the ones who suffered the most from the introduction of the herbicides. Thus, to pin-point the issue, it is useful to judge the
impact of technical change on any field related work for women in which it is necessary to take into account several aspects which are outlined below:

(a) The unequal division of burden of family work appears to be a common feature. Women work longer hours. What appears is that unequal division of labour on the farm is further re-inforced by unequal division of labour inside the household.

(b) Research analysis of ICRISAT on village level market- participation rates, wage rates, composition wage, the provision of meals alongwith wages, cash and kind indicated that a better nutritional status conferred a significant positive effect on the daily wages of men but not on those of women.

(c) Effect on the participation was the opposite, however, women who were better nourished participated more actively in the daily market for casual agricultural labour while the nutritional status of men was not significantly associated with their participation in the labour market. This explains of low income households in rural area. It also explains to some extent the tendency for the diversion of food away from nutritionally vulnerable member to the male adult in a family under the nutrition intervention programmes for vulnerable groups.

(d) Whether or not the benefit of modern farm technology will depend on a number of complex factors and this can be known by the change inwages. Thus, the observed employment advantages which modern technologies offer cannot be assumed necessarily to benefit the women.

(e) When a proper accountability of the economic value of all work is undertaken, women contribute more to family income than men because they work more. Discrimination to farm women is practiced in two ways, one is to pay less
for the same type of work and the other is to restrict them to low paid unskilled jobs and denying them access to better paid work.

(f) As the rate of rural to urban migration increase with the possibility hire wages and modern amenities in the cities, rural women are often forced with the added burden of having to manage and operate their entire farm and household without any help from their husbands.

(g) In most communities the women have an important role in agricultural decision making. In agriculture two types of farm management decisions are recognised: On labour allocation and an agricultural production.(4) In agricultural production women make an overwhelming majority of the decisions.

All these aspects indicate that the implications of technological change on women are likely to be mediated through sex related factors.

Therefore, from the technological perspectives, it is equally important to ensure great access by this group to various inputs needed to carry out their work more efficiently and to generate or adopt cheap and simple innovations which could reduce the strain of women's work. Farm women have little access to non-formal education, rural institutions and extension services. The agricultural extension services are mostly composed of male agents and as such they tend to channel knowledge and training on improved technology to the male farmers.(5)

Moreover, present post-harvest technologies are mostly geared for large producers. Women from small farm families can have access to modern technologies which could be possible with the reorganisation of present
individualized operations into consolidated village based activities. Thus, the most significant feature that emerges is the inequality of women workers in relation to technical training inputs and knowhow in agriculture. Government and scientific institutions should promote technology to improve and strengthen the necessary infrastructure to lighten the work load of rural India, but ensuring that such measures do not result in occupational displacement of women.
IV  Current status of information with respect to crops selected for study

a. Paddy.

Paddy can refer to the entire growing plant or to the harvested grains which have not been milled. The word is sometimes spelled padi. It is synonymous with the word palay, which is of standard use in the English spoken in the Philippines. The term paddy is often used with the same meaning as rough rice, which refers to the unmilled rice. After the outer husk is removed, the grain is called brown rice. After the bran layer is removed by polishing or whitening, the grain is called milled rice or white rice. The processes described in subsequent chapters of this book should give the reader a good understanding of the precise meanings of these terms. When dealing with quantities of materials, such as yield data, process capacities, or market volumes, it is important to differentiate properly between rough rice, milled rice, and other terms. The term stalk paddy refers to the rice plant which has been cut but not threshed. Sometimes the term paddy variety is used with the same meaning as rice variety. In several Asian countries, government agencies carry the title of "Paddy Marketing Board".

The urgent need to increase food production to meet the requirements of a rapidly growing world population is widely recognized. Rice is one of the most important food crops in the world, and the major item in the diet of half the world's population. The availability of an adequate supply of rice and other food commodities means more than simply providing for people's nutritional needs; rice has economic importance in local and international trade with significant political
and social implications, and for many people rice production is an integral part of
t heir culture. The production of rice is a predominant part of the agriculture of
most Asian countries, and in many cases national policy is directed towards self-
sufficiency in rice production.

In India rice is the most important extensively grown staple food crop
occupying 42.3 million hectares representing 40 per cent of the total area under
cereal crops. Among the rice growing countries, India has the largest area under
rice (2.4 per cent). In respect of production, India ranks second with 73.6 million
tonnes of rice which is about 18.7 per cent of the world production.

Among the states, UP ranks first in respect of production and Punjab ranks
first in respect of productivity. In Tamil Nadu the area cultivated under rice is 21.1
lakh hectares with production of 6.5 million tonnes during 1991-92. At present
major thrust is being given in rice production to get higher per hectare yield. All
the districts in Tamil Nadu are having paddy cultivation as a primary one. In Tanjore
and certain parts of Tamil Nadu paddy is cultivated more than once in a year. The
short duration variety and high yielding varieties like 1R50,1R20, J13, ADT 25, ADT
36, Ponni, are the chief crops in Tamil Nadu.

With a production of 75 million tonnes of rice India has emerged as the
second largest producer of rice next only to China. Indian Rice Scientists have been
successful in developing a dual purpose rice variety which gives high yield in both
rainfed and irrigated conditions. It India can be doubled and even trebled with the
existing area on rice generating handsome surpluses for export in the years to
come. Hence rice has been rightly identified as one of the thrust areas for promotion of export from India. The impact of green revolution in crops like rice attributed to the yield increase per unit area in India is mainly due to the development of semi-dwarf rice varieties and crop management practices. 50 million tonnes of food grain were produced in 1950-51.

Indian farmers today are producing nearly 210 million tonnes, the farmers have utilized these to grow a wide variety of crops from the temperate Himalayan region to the tropical and sub-tropical regions of South India. The agronomic practices discussed here for hybrid rice technology is mainly for optimum resource utilization and maximum economic benefit per unit area of land for the Indian farming community.

Much of our success in rice production over the past 25 years has been largely based on a combination of modern varieties, irrigation and large scale use of nitrogenous fertilizers. Whereever assured irrigation is available, significant yield responses could be obtained at immense risk of degradation of the soil structure, soil microbila population and fertility status due to indiscriminate use of chemical fertilizers. However nitrogen and other chemical fertilizers alone do not contribute to a build up of soil fertility. The use of farm yard manure, leguminous green manure crops tend to maintain long term soil fertility and ecological sustainability of the rice soil ecosystem.
b. Sugarcane:

Post Independent India has made great strides in increasing sugar cane production. The progress both in global and national context has been quite satisfactory. Sugarcane production which was only 57 m.t. in 1950-51 increased to 1 million m.t. in 1990-91. The year 1991-92 witnessed a record production (249 m.t.) and coverage (3.79 m.ha) under sugarcane.(4) Among principal crops, the annual growth rate in pre-green revolution period was maximum in sugarcane and next only to wheat in post-green revolution. Increase in production coupled with increasing crushing capacity resulted in increase of about twelve times (1.13 to 13.28 m.t.) in sugar production since 1950-51 enabling the country to export over 0.5 m.t. of sugar during 1991-92. Per capita sugar availability also increased by over four times (3.1 to 12.9 kg per annum) during the period.

There has been a continuous increase in sugarcane production during the last 4 decades. However, the growth pattern has not been uniform through time and space. The period 1985-86 to 1990-91 witnessed a record increase in area and production and it accounted for nearly two-fifth of total increase in area and production since 1950-51. In record increase of 70 m.t. in sugarcane production during 1985-86 to 1990-91, the contribution of two States (U.P. and Maharashtra) was exceedingly high (60 per cent).

Undoubtedly India has made remarkable progress in sugarcane and sugar production front, the same has not been highlighted much due to country's major concern towards maintaining self-sufficiency in foodgrain production.
Sugarcane is the most important sugar crop and accounts for about two-third of world sugar production. It is being grown under a wide range of conditions in tropical and sub-tropical regions of the world.

Sugarcane occupies pivotal position in India's agricultural economy. Grown over about 2 per cent of gross cropped area, it contributes 7 per cent of total value of agricultural output in the country. About 25 million growers are engaged in sugarcane cultivation. Sugarcane crop sustains country's second largest agro-industry (sugar industry) which provides employment to over 4 lakh people through its nearly 400 sugar factories scattered in different parts of the country.

The last four decades have been the period of impressive growth in sugarcane production. Compared to cereals, where in real breakthrough in yield came in late 60s, a quantum jump in sugarcane yield was achieved much earlier (1936-40) with the exploitation of interspecific hybrid vigour. It is because of this fact that increase in sugarcane productivity was quite appreciable 33.4 to 45.5 t/ha) between 1950-51 to 1960-61. Having achieved the initial spurt in area and productivity, the growth however slowed down from 1960s onwards. As against increase of 41 per cent (1.71 to 2.41 m.ha.) in area during first decade, the area increased only by 18 per cent (2.41 to 2.85 m.ha.) in next two and a half decades (1960-61 to 1985-86). From 1985-86 onwards, India's growth on sugarcane and sugar production front has been spectacular. Increase of about 46 per cent in cane production (170.6 to 249.3) along with 14 per cent increase in crushing capacity (40.2 to 54.1 per cent) during 1985-86 to 1991-92, increase in sugar production by over 89 per cent (7.02 to 13.28) in just 6 years is a record increase
indeed. The country's sugar stock rose up to 4.83 m.t. which enabled it to export 0.58 m.t. sugar during 1991-92.

It is a testing time for our economy. Most of the closed economies of the world have converted themselves into market economies. We have to produce sugar to meet the domestic requirements of our 850 million people; we have to generate exportable surplus to service the external outstanding debts amounting to over Rs.200,000 crores, while meeting the import bills. During the recent months, the import bill on petroleum products has been very high, say about Rs.2000 crores per month.(5)

The managers of our economy have proved their expertise in handling scarcity conditions. They are yet to display their expertise in handling surplus situations. Had they been successful in handling surplus situations, our sugar production could have witnessed a steady growth and maintained our sugar-exports growing instead of drifting to be importers of sugar.

Of the 240 million tonnes of sugarcane produced from 3.7 million hectares only 122 million tonnes have been handled by 385 sugar mills in the country. It will be a pleasant exercise if we analyse different strategies of utilising the sugarcane to derive lasting benefits to

(i) the sugarcane farmers
(ii) the consumers
(iii) the sugar mills and
(iv) the nation as a whole.
After providing for setts, 50% of the sugarcane can be utilised for production of white sugar, 30% for production of low purity sugar (jaggery) and 20% production of alcohol directly from sugarcane juice along with molasses. This can be achieved when distilleries are attached to the sugar mills. In this process the entire sugarcane produced will be consumed by the organised sector with an assured price for the farmers. If we can divert 20% of the sugarcane available for conversion of alcohol along with the molasses we can envisage an additional production of 4000 million litres of rectified spirit. This additional of alcohol can be a substitute for 4000 million litres of petrol valued at Rs.6800 crores per annum. When the sugarcane farmers are assured of a remunerative price for their sugarcane, they will take intensive efforts for stepping up the yield to 100 tonnes per hectare and our sugar production will go upto 170 lakhs tonnes with an alcohol production of 8500 million litres annually.(6)

While the country has made much progress in improving sugarcane and sugar production, what remains to be done is enormous. Sugar requirement to feed the population of about a billion by 2000 AD is estimated to be around 20 million tonnes. In order to achieve the sugar production target of 20 rrt.t., the sugarcane production has to be around 350 m.t. by the turn of the century. It would require an increase of about 1 10 m.t. in annual production in next 8 years by increasing coverage and productivity.

Sugarcane area increased by about 1 m.ha during 1980s. However, increase of the same order cannot be expected during 1990s because increase in area also has its limitations as evident by decrease of 0.14 m.ha in area during 1992-93.
Assuming a moderate sugarcane area increase of about 0.5 m.ha, a productivity increase of about 20 t/ha (65 to 85 t/ha) would be needed to achieve the anticipated target of 350 m.t. It took 30 years (1960-61 to 1990-91) to bring increase of about 20 t/ha (45 to 65 t/ha) in productivity and to achieve the increase of same magnitude in less than a decade is very challenging, if not impossible. Sugarcane productivity is stagnating around 65 t/ha for the last 3 years and the area has rather decreased in 1992-93. Conceited efforts would therefore be needed to step up sugarcane area and productivity to achieve the production target of 350 m.t. by 2000 A.D.
V Training for Agricultural Modernisation

a. Meaning of Training:

It is felt that a young person entering a career will have to be trained for two or three professions in the span of their active lines of work. This is because many new developments will render much of today's knowledge obsolete.

Man's knowledge, like machines, can rapidly become obsolescent. 'Training is a means to reduce the obsolescence among people and organisations in the face of relentless technological innovation'. The professional worker must keep abreast of the latest development in one's field, otherwise one will soon be working far below one's own potential and capacities.(i)

Training has special significance in the field of agricultural development and in the context of community development extension since the very essence of these programme is to train rural people to solve most of their problems individually or in group. The success of the extension worker can be judged ultimately by the extent to which he has been able to make the village people self-reliant, in getting them to do things by themselves without relying on outside help.

Ensiminger has stated that it is not enough to agree that all staff administrators, specialists, village extension workers-should be trained in the methods of extension education. To be trained in extension for community development means, according to him, first to understand the philosophy and objectives of community development; second, to understand what is meant by
extension; third to know what can be expected from the correct use of extension; fourth to know how to apply extension methods and finally to know how to evaluate the effectiveness of the extension methods used. It has been pointed out that extension involves not only educating the rural people in determining their problems and methods of solving them, but also inciting them towards positive action. It is, therefore, of the highest importance for this task that personnel of the right types are obtained who will take to their work with zeal and enthusiasm.

The role of the extension worker, discussed earlier, indicates clearly the need for a new kind of worker. This has been recognised by the planners and administrators of rural development programmes. This type of worker should be able to get on well with the common people, know their way of life, have sympathy with their hopes and aspirations and possess a genuine desire to help them. In contrast to the past, Government servants must approach the villager as a friend-one who wants to and will help the villager learn how to make decisions and achieve for himself and his family a better way of life.

b. Education Versus Training:

According to Sohal (1975), it is possible, although according to some it is not desirable, to differentiate "Training" from "Education". There is in fact, far too much in common between them so that there could only be some hair-splitting differences of academic interest. In a restricted sense "training" may be take to connote the acquisition of knowledge, skills or attitudes needed specifically for performing a particular job, whereas "education" may refer to all sorts of acquisitions, with or without a prespecified purpose or job, to be performed.
Education, is therefore, inclusive of training as well. But the concept of "education" in the present day is not merely confined to whatsoever is taking place in the formal sets of learning like schools, colleges, or universities. Any acquisition or change by way of addition in the behaviour complex of homosapiens, taking place at any time of his life from birth to death and from any source or manner, is aptly considered as "education".

Graig and Bittel stated; "The word "training" despite the efforts as some to take it a semantic shipping-boy, is accepted as synonym for all of the forms of knowledge, skill and attitudinal development which adults need to keep peace with accelerated life involvement and the enlarging concept of man's capabilities. "Sohal further suggests that "training" has the embodiment, requirements and characteristics of education. At no time should training be considered as less exciting or inferior to education. As a matter of fact, in hardly and the setting concerning the dissemination of knowledge leading to the adoption of newly evolved innovation by extension workers, are the principles and theories of education so intimately and thoroughly applicable as would be the case when any of the methods dealing with training are involved. The need for knowing fully well the process and theories of learning is much more pronounced for any one connected with "training" than for those utilising other approaches for disseminating knowledge or bringing about changes in behaviour.(2) It must, however, be remembered that this comparison is of "degree" and not of kind. It must not be inferred that knowledge of the learning process is of no consequence for the extension worker using methods other than training.
c. **Technical know-how:**

The per acre yields, or per milch animal milk production or egg laying per poultry layer is the lowest in India as compared to other countries. This is because there is a large gap in the latest technology known and the technology being used by the farmers, animal raisers and poultry keepers, etc. The same is true regarding home science, health and sanitation. Our resources are not being utilised properly because our people in the villages are ignorant about many scientific innovations. The communication of the desired knowledge requires training personnel, who have knowledge the techniques, are interested in doing their job efficiently and know the ways of imparting this knowledge to the people who need it. To raise 60 quintals of paddy or wheat per hectare in place of 51 quintals per hectare requires the assistance of properly trained extension workers.

Without such knowledge the extension worker cannot do his job effectively. Even if he has sound knowledge of a technical subject e.g. in crop-raising, and does not know how to communicate this knowledge effectively he cannot do his job properly. This is like knowing the mechanism of a motor car but not knowing how to drive it. Because of the lack of knowledge of extension methods, the extension service of the State Department of Agriculture before 1952, could not do its job effectively. Before 1953 our country did not realise that there could be a subject like extension education. Graduate trained in Extension Education and Rural Sociology were available to the Extension service after 1959 and this marks a turning point in India’s extension service.
The technology was there, the agricultural colleges existed in India since 1905, but they did not know "How to Extend". Because of the lack of this knowledge most of our technology remained in the files of plant breeders, entomologists and crop specialists. The gap between the research institutes and the farmers continued because of this missing link. The integration of the teaching, research and extension, and the training of the extension workers was responsible for the Green Revolution. The history of the development of Agriculture in the USA, Taiwan, Japan, Israel shows that it was because of trained extension personnel and in-service training of the extension workers that the gap between the technology known and the technology used by the farmers could be removed. So the earlier we are able to provide trained personnel who passed the technology and the faster will be our rate of adoption and growth rate.(3)

**d. Krishi vigyan Kendra: (Farm Science Centre)**

Krishi Vigyan Kendra (KVK) is an innovative science-based institution which undertakes vocational training of farmers, farm women and rural youths; conducts on-farm research for technology refinement and frontline demonstrations to promptly demonstrate the latest agricultural technologies to the farmers as well as the extension workers. The KVK functions on the principles of collaborative participation of scientists, subject-matter experts, extension workers and farmers.

Based on the recommendations of the Education Commission (1964-1966) and the inter-Ministerial Committee (1973), the ICAR decided in principle to establish Krishi Vigyan Kendras in the country. A high-level committee headed by
g. **Mandate for KVKs:**

In the present context of agricultural development where participation of farmers and extension agencies has become imperative in the technology generation process, the mandate of the KVKs has been widened to encompass on-farm research and frontline demonstrations. The detailed mandates are as follows:

(i) Collaborate with the subject-matter specialists of the State Agricultural Universities/scientists of the Regional Research Station, NAEP and the state extension personnel in "on farm testing". Refining and documenting technologies for developing region-specific sustainable land use systems.

(ii) Organise training to update the extension personnel within the area of operation with emerging advances in agricultural research on regular basis.

(iii) Organise long-term vocational training courses in agriculture and allied vocations for the rural youths with emphasis on "learning by doing" for generating self-employment through institutional financing.

(iv) Organise front-line demonstrations in various crops to generate production data and feedback information. The main objective of the KVK is to provide a strong training support for bringing about production breakthrough in agriculture. The specific objectives are as follows.

1. Plan and conduct survey of the operational area to prepare the resource inventory with special reference to identify the training needs of the farming community.
2. Compile all relevant recommendations/package of practices for the district to be meaningfully utilized in the training courses and the follow-up extension programmes.

3. Plan and conduct production-oriented, need-based short and long-duration training courses both on the campus, as well as in the villages for various target groups with priority on the weaker and poorer sections.

4. Organize Farm Science clubs, both in rural schools and in villages to inculcate in the younger generation a liking for and an interest in agricultural and allied sciences and for scientific farming through supervised projects.

Develop and maintain the campus farms and demonstration units on scientific lines, as the facilities for providing work-experience to the trainees as also dissemination of the latest technical know-how.

5. Provide practical training facilities of the Kendra to the teachers and the students of vocational agriculture of higher secondary schools.

6. Impart some general education to the rural illiterates and school dropouts in order to make them not only good farmers but also better citizens.

7. Provide training facilities in home-making and nutrition education for rural community and gradually encompass other important areas such as home crafts and cottage industries, consistent with.

**f. Training and Visit system:**

T&V system, the new extension approach innovated by BENOR, was felt to be the best, as if look into consideration the below principles.
- eliminating parallel Management control and extending single line of command
- strengthening the link between allied research and extension
- establishing systematic scheduled for staff training and increasing staff mobility for farm visits and
- maximum utilisation of available resources.

This system was first tested in Rajasthan canal and Chambal command areas of Rajasthan and Madyapradesh and in command areas of Andrapradesh during 1974. In Mid 1975, the system was introduced in six district of West Bengal the National Commission of Agriculture, during 1977 laid greater emphasis on strengthening the extension service in India. Encouraged outcomes under the T &. V system in the command areas, and the recommendation of National Commission on Agriculture gained momentum and the government of India decided to recognise Agricultural Extension service.(4)

Therefore a centrally sponsored scheme titled strengthening and reorganisation of Agricultural extension administration in states was approved by Government of India during 1977. This was extended to the states of Assam, Bihar, Madhyapradesh, Orissa, Rajasthan, West Bengal, Haryana, Gujarat, Kamataka, Maharashtra, Andhrapradesh, Punjab, Uttarpradesh and Tamil Nadu with world bank assistance.

g. T & V system in Tamil Nadu:

T &. V system was introduced in Tamil Nadu during April, 1980 on a pilot measure in Madurai District. It was further extended to other district of Tamil Nadu
in a phased manner. The key features of the training and visit system of agricultural extension, according to Benor and Baxter (1984) are as follows:

1. **Professionalism:**

   Extension staff must keep in close touch with relevant scientific development and research in order to formulate specific recommendations that will be useful to farmers in all kinds of resource situations. This can be achieved only if each extension worker is fully and continuously trained to handle his particular responsibilities in a professional manner.

2. **Single Line of Command:**

   The extension service must be under a single line of technical and administrative command within the Ministry/Department of Agriculture. Support is required from teaching and research institutions, input supply and other agricultural support organizations, and local government bodies, but all extension workers should be responsible administratively and technically to a unit within only one department.

3. **Concentration of Effort:**

   Concentration of effort is a feature of all respects of the system. All extension staff work only on agricultural extension. Staff are not responsible for the supply of inputs, data collection, distribution of subsidies, processing of loans, or any other activity not directly related to extension.
It is assumed that the effective span of control or supervision or guidance is about eight. Hence, no extension officer should have more than eight staff or officers, which he must personally supervise and for whose performance he is specifically accountable. A similar principle of realistic responsibility hard work effectiveness is followed in malting VEWs responsible for a limited number of farmers' groups and for dealing primarily with a smaller number of farmers' within these. In training sessions, attention is concentrated on important major points. Similarly, extension-oriented research, concentrates on key constraints to increased production and income that are faced by the farmers.

4. Time-bound work:

Messages and skills be taught to farmers in a regular-, timely fashion, so that they will make best use of the researchers at their command. The VEW must visit his farmers regularly on a field day, usually once in each fortnight. All other extension staff must make timely and regular visits to the field. Recommendations for a specific area and for particular farming conditions for each two-fortnight period, discussed and learned by subject Matter Specialist (SMSs) at regular monthly workshops; the recommendations are then presented to VEWs and Agricultural Extension Officers (AEOs) at the next two fortnightly training seasons. Any break in this time-bound system makes effective extension difficult.

5. Field and Farmer Orientation:

To serve the farmers effectively, an extension service must be in contact with them. The contact must be on a regular basis, on a schedule known to Farmers, and with a large number of farmers representing all major farming and
socio-economic types. While spending almost all of their time in the field meeting
with farmers, extension workers must attempt to understand farmer's production
conditions and constraints in order that appropriate production recommendations
are formulated.

6. Regular and Continuous Training:

Regular and Continuous training of extension staff is required both to teach,
and discuss with them, the specific production recommendations required by
farmers for the coming fortnights and to upgrade and update their professional
skills. Moreover, the basis of training sessions, Fortnightly training and monthly
workshops, are the key means of bringing actual farmer's problems to the
attention of research, identifying research findings of immediate relevance to
farmers, and of developing production recommendations that fit specific local
conditions.(5)

7. Linkages with Research:

Effective extension depends on close linkages with research. Linkages are
two-way. Problems faced by farmer that can not be resolved by extension workers
are passed on to researchers for either on immediate solution or investigation..
During seasonal and monthly workshops and joint field trips, extension and
research staff formulate production recommendations that will be adopted by
extension workers as necessary, to make best use of the specific local environment
and actual farmer's resources.
Researcher’s awareness of and reaction to actual farm condition is increased through responding to problems that have been put forward by extension workers, through the training of extension staff, and through field visits. The heightened awareness and taking account of local conditions has the beneficial effect of helping to orient some of researcher's attention to the important practical matter of farmer’s production conditions and constraints.
VI  Women and Agriculture

According to Swaminathan (1985), some historians believe that it was women who first domesticated crop plants and thereby initiated the art and science of Farming. While men went out hunting in search of Food, women started gathering seeds from the native Flora and began cultivating those of interest from the point of view of Food, Fodder, Fibre and Fuel.

Women have played and continue to play a key role in the conservation of basic life support systems such as land, water, Flora and Fauna. They have protected the health of the soil through organic recycling and promoted crop security through the maintenance of varietal diversity and genetic resistance. Therefore, without total intellectual physical participation of women, it will not be possible to popularise alternative systems of land management to shifting cultivation, arrest gene and soil erosion, and promote the care of the soil and the health of economic plants and Farm animals".

The women play a significant and crucial role in agricultural development and allied Fields including, the main, crop production, live-stock production, horticulture, post-harvest operations, agro/social Forestry, Fisheries, etc., is a fact long taken for granted but also long ignored, the nature and extent of women’s involvement in agriculture, no doubt, varies greatly from region to region. (1)

Even within a region, their involvement varies widely among different ecological sub-zones, Farming systems, castes, classes and stages in the Family
cycle. But regardless of these variations, there is hardly any activity in agricultural production except ploughing in which women are not actively involved. In some of the farm activities like processing and storage, women predominate and therefore men workers are numerically insignificant. Studies on women in agriculture conducted in India and other developing and underdeveloped countries all point to the fact that women contribute far more to agricultural production than has generally been acknowledged. Recognition of their crucial role in agriculture should not obscure the fact that farm women continue to be concerned with their primary functions as wives, mothers and homemakers. Traditionally, women had no definite decision-making role in a majority of family affairs because of dominance of male members in the joint family system. The situation now seems to be changing considerably owing to the introduction of new home and farm technologies and disintegration of the joint family system. But despite all this, the patriarchal system of family like which has been in vogue since time immemorial has relegated women to the background.

It is accepted on all hands that women play crucial roles in production, storage and processing of food in most societies. But as Swaminathan (1985) observes, "despite their importance to agricultural production, women face severe handicaps". They are, in fact, the largest group of landless labourers, with little real security in case of break-up of the family through death or divorce; inheritance laws and customs discriminate against them. Land reforms and settlement programmes usually give sole title and hence the security needed for obtaining production credits to the husband.
Agricultural development programmes are usually planned by men and aimed at men. Mechanization, for example alleviates the burden of tasks that are traditionally men's responsibility leaving women's burdens unrelieved or even increased. The excess burden of work on women ("the double day") of the farm work plus house work also acts as a stimulus to have many children so that they can help out with chores from an early age. Extension workers, almost exclusive male, aim their advice at men and at men's activities and crops.(3) In some regions, this bias may depress production of subsistence food crops (often women's crops) in favour of increased production of cash crops (often men's crops) so that family nutrition suffers.

AH agricultural services still have a sex bias in favour of men. Women are generally by-passed in development efforts. For instance, group discussion meetings are usually held in villages involving mostly men. Further, the venue and timing of such meetings are inconvenient to women and hence even most needy women are not able to attend. So, is the case with training. While designing a training programme for women, their duty rather triple burden of child rearing, farm work and house hold responsibilities, is not given due consideration. Its venue, timing, duration, content and methodology are not very appropriate for women. It is mostly held at centres which lack necessary facilities for women and infants. Child-care facilities are not considered as an essential component of women's training programme.(4)

Similarly, information regarding home and farm innovations is often communicated through channels like radio, tv, pamphlets and the like which are
inaccessible to women. Notwithstanding all this discrimination and unfair deal, women play a vital role in agricultural development and for that matter, in any field. But they have visibly been side-tracked in so far as their contribution to agricultural development and access to development and for that matter, in any field. But they have visibly been side-tracked in so farm as their contribution to agricultural development and access to developmental resources and services are concerned.

Technology and credit are among the most crucial inputs for any enterprise. But although women’s significant contributions to agricultural development more than justify their being given access to productive resources, their eligibility to receive technology and credit is questioned on the ground that they are not asset holders and do not have the status of a producer. Moreover, the extension approaches and strategies usually followed for transfer of technology to women are not in keeping with their specific needs and problems.

Similarly, the existing loaning procedures are exceedingly cumbersome and prohibitive for women. Thus, they have little or no access to new home and farm technologies and other necessary inputs including among others, credit that the present-day modern capital-intensive agriculture calls for - In nutshell, women have access neither to agricultural information and services nor to production assets.

They have also no control earnings. This does affect their motivation to engage in different types of income-generating activities. It is in this context that the involvement of women in production-oriented training and extension programmes not only as beneficiaries but also as change agents assumes great
significance. Without education and training, they cannot have access to credit, technology and skills they need to better their lot and increase their efficiency as productive workers. It may not be out of place to mention here that considering their dual responsibilities within and outside the home, it would be in the fitness of things that more and more in-the-village training is organised for rural/farm women to suit their convenience with due realization that institutional training is important in its own place.(5)

It underlines the need for creating mobile training centres to better serve the interests of farm women and young girls at their very door steps. Long duration residential vocational training courses are needed both in the field of agriculture as well as home science especially, for the young fills. The Krishi Vigyan Kendras (Farm Science Centres) are devoted to training females in home science, as well as in agriculture including long term courses.

Initial differences between women and men many perpetuate the gender differences in the wake of agricultural development, within a specific socio-cultural group. Some of the important aspects are the nature and extent of their participation in agricultural field operations, non-agricultural operations like animal rearing, fetching fuel, water and fodder, child care, domestic work and chores, etc.; the extent of their control over, and pattern of distribution of household earnings and consumption goods; and the extent of their direct access to productive resources and power to dominate in decision making.(6)
As discussed earlier, these differences seem from historical, social and cultural factors, which in addition to the economic, govern the norms vis-a-vis the sexual division of labour in the home and outside. In the developing agriculture how these would affect the woman are discussed in this part.

The strategy for agricultural development in India and other developing countries has the basic elements of the use of high yielding variety seeds: mechanisation of farm operations; use of agro-chemicals, i.e. fertilizers, insecticides pesticides, weedicides or herbicides, hormone-accelerators, etc.; improved cultural practices like proper sowing time, depth of sowing, critical stages of irrigation, weeding, harvesting, and post harvest technology. Similarly, in plantation crops, dairying, fishery and other allied aspects of agriculture operations are much more technical as compared to traditional agriculture. These changes in agriculture, or in other words the development in agriculture has altered the traditional role and status of women in agriculture. In the preceding pages some explanation of changes in elements of agricultural development and impact on women has been discussed. These changes would determine the future role of women.(7)

In future, the employment opportunities as wage labourers as well as farm women would decrease as a result of the replacement of manual labour by mechanization and the use of agro-chemicals in farming operations. Recent developments of post harvest technologies, marketing system and food industries would not leave any scope for work and employment for rural women with her traditional skills.
VII Grass root level impact of training:  
the crux of the matter

Training in itself is not enough in modernising the agricultural practices. One needs to understand what exactly happens at the grass root level in terms of the performance of the trained farmers; equally important is to know what transpires between the trained and the untrained.

A study was undertaken by Kamla Nehru Krishi Vigyan Kendra to assess the impact of training in terms of adoption and increase in income of the farmers, to study the existing organisational infrastructure, and training process. The salient findings of the study are as follows:

The KVK has a well developed training infrastructure, adequate staff and operative linkage with different agencies. The social participation, risk orientation, achievement motivation, sources of information used, change agency and contact were the differentiating factors between trained and untrained farmers. The trained farmers were found to have higher level of adoption and increase in income as compared to untrained farmers. The education, social participation, risk orientation, and achievement motivation were found to have significant positive relationship with adoption and increase in income.

The trained farmers reported a systematic process of training being followed by KVK. They perceived inadequate amount of stipend and inadequate transport facilities as problems. The trainers of KVK also reported that they followed a
systematic process of training by frequently assessing the needs, selecting suitable
participants, formulating need-based courses with specific objectives and using the
lectures, demonstrations as training methods and black board, chart, poster and
instructional farm as training materials.

Thus, training has significant impact on the socio-economic change of small
and marginal farmers. Systematic and well organised training can be acclaimed as a
powerful tool of development.

Murthy conducted a study on the "Factors affecting the knowledge of
paddy growing farmers"(2). He has this to say; "the positive and significant
association of caste with the extent of knowledge might be due to the reason that
prestigious castes try to get more information from different sources to safeguard
their status in the looks of others in the society. In the process they would become
more knowledgeable than other caste people. That would have been the
reasonable assumption for such relationship between the caste and extent of
knowledge. Higher the caste of the farmer, the more would be his knowledge
about Improved and recommended practices in paddy."

Generally farm power is associated with land. If the farmer is having more
lands, it is likely that he would possess more draught animals, prestigious animals,
tractor and tractor drawn implements. It is stated elsewhere that land has shown
positive and significant association with knowledge. As the farm power is related
to land holding and land holding is related to knowledge, it could be safely
assumed that farm power would be related to knowledge of improved paddy
practices. It could be concluded that more the farm power, the higher would be the knowledge.

Risk preference was also found to have a positive and significant association with the extent of knowledge of improved technologies in paddy. A farmer who is willing to take risk is willing to enter into new experience in his farming life. This experience might result in increasing his knowledge about the paddy crop.

Umamahesha and Channegowda(3) emphasize the "Impact of peripatetic training on the attitude of farmers". They say that the on-farm training and those conducted in the homes of farmers are equally important as the institutional training.

Verma(4) concluded from his study thus:

"Majority of farmers preferred progressive farmers as most important source of information for all aspects of sugarcane cultivation. The next in order of preference was observed as demonstration by all categories of farmers except medium farmers. Thus, for efficient transfer of technologies the progressive farmers of the villages should be contacted to train others in modern farm technology through appropriate methods so that they could serve as more useful and effective communicators of farm ideas to supplement the effort of extension agency. Besides, extension personnel should also organise effective demonstration of latest technical know-how on farmer's fields so that they could develop confidence about improved farm technology."
As a means of transmission of new ideas the mass communication, informal/personal approach and demonstration methods have been most successful. If we analyse time span of innovation, we find, it is a very slow process. It goes on through piecemeal speed. The farmers are not ready to take risk very soon unless they are convinced of the results. The failure of "Sonora-64" indicates that if the people lose faith once it looms large, and such consequences may have a number of repercussions, making the farmers more reluctant. Failure of one scheme is a curse and a red signal for a long time for any new scheme.

Modern agricultural technology is sophisticated, precise and location-specific, requiring adequate knowledge for its on-far use Mathiyazhagam and Singh, (1986). While emphasis has been laid on production of cereals pulses and oilseeds, much has to be done yet in the case of sugarcane crop. So far, practically no attempt has been made to assess the training needs of sugarcane growers. In his study Arulraj(5) found the following:

The differences between the levels of overall training needs of registered and non-registered sugarcane growers was found to be highly significant. Significant differences were recorded between the training needs of registered and non-registered sugarcane growers with respect to five practices namely, seed rate, sett treatment, spacing, earthing up and harvesting.

Both the registered and non-registered sugarcane growers were in need of training. While conducting such training programmes, special emphasis may be given to the following subject matter areas (recorded more than 90% training
need): Sett treatment, fertilizer application, trash mulching, weed management, plant protection measures and ratoon management for registered growers and variety and season, sett treatment, fertilizer application, trash mulching, weed management plant protection measures and ratoon management for non-registered sugarcane growers.

Provision of timely and adequate credit facilities is a pre-requisite for sugarcane growers because it is a long duration crop and involves relatively high cost of cultivation. Credit is one of the crucial input in speeding up the adoption of improved technology. Joint efforts of banks, sugar cooperatives and sugar industry are needed in improving credit facilities to sugarcane growers. Sugarcane area recorded a considerable increase of about 33 per cent in last six years (1985-86 to 1991-92). Besides developmental strategies, price incentives have played a key role in encouraging the Farmers to bring large area under sugarcane. To bring further increase in sugarcane coverage, offering remunerative prices for produce together with credit facilities is a must. There should be a provision of suitable premium for good quality sugarcane to encourage the growers to bring more area under quality sugarcane. It will help in improving sugar recovery which at present is relatively low. (6)

Thirdly, innovation in agriculture is also to be supported by allied facilities, otherwise the total result can hardly be realised. Fourthly, acceptance of one new idea or a set of new ideas meant for one sector of life does not simultaneously affect other sectors of life. There are changes evident in farm practices, but hardly
my change is evident of the corresponding nature in social phenomena of family under study. Hence, change in farm operation does necessarily not bring about change in social life of the family. And lastly, it is observed that though economic assets are being accumulated; but their propensity to spend money on certain modern heads like dress, style of life and recreation is not increasing.

The findings of this study will be of great encouragement and a source of inspiration to the extension personnel who organise such small duration training, to see that their efforts produce desirable results. It is also implied that the impact of training programmes does not depend upon its duration nor on farmer's socio-economic characteristics but rather on other factors such as the need of the participants, relevance of the message and the effectiveness of teaching methods employed.

Studies of the above kind bear relevance both for the grass root level in the practical sense in terms of initiating efforts to improve the performance levels of trained farmers; they also throw light on those aspects of training programmes which can be seriously considered for toning up of the format of farmer's training programmes.
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VII Grassroot level impact of training : the crux of the matter.-


