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III.1 AGRICULTURE IN RURAL DEVELOPMENT

In a predominantly agrarian society like India, where more than three-fourth of the total population live in villages and more than 80 percent of the rural population depend on agriculture and allied activities for their livelihood, rural development is a sine qua non of national development and agricultural development is a prerequisite for rural development. Therefore, in such a country, agricultural development should form the foundation for national development. Traditionally, the word agriculture has been associated with the occupation of basic food production, known as farming. Agriculture and farming were synonymous before farmers began selling their products and purchasing farm inputs in commercial markets. However, today, producing food and farming is only one part of scientific agriculture. Modern agriculture includes the farm supply industries like seeds, fertilizers, pesticides, machinery, feed etc., as well as product processing and distributing industries which convert raw food and other raw materials into the forms consumers want.

Thus, agriculture use in the broadest sense includes all segments of farming. It includes crop Husbandry, Animal Husbandry, Fish Farming, Sericulture, Horticulture, Forestry, Agricultural Engineering, Home Science and several others. Agriculture encompasses the two dimensions - Agriculture as a means of livelihood is an organized body of knowledge for developing, guiding and directing agricultural production, processes and skills. On the other hand agriculture as a way of life represents certain values, ideas, attitude, customs, traditions and confidence.

The role of agriculture in economic development has been recognized since the time of the physiocrats. According to the physiocrats, it was only the agricultural sectors which produced an economic surplus over cost of production and therefore it played the most strategic role in economic development. Therefore, agriculture must be pushed by a strategy emphasizing the use of modern technology and supporting infrastructural facilities and services. ¹

The continuing importance of agriculture in the economies of the developing countries is reflected in the association between the growth of agriculture and that of the economy as a whole. Agriculture also remains the primary source of employment for the majority of the world's population. Some 61 percent of the population of the developing

world is employed in agriculture and 18 percent of its gross domestic product is derived from the land.² Despite increased urbanization and growth of the industrial and service sectors, more people each year are working in the agricultural sector than in the previous year. Thus, enhancement of the productive capacity of the agricultural sector is crucial to the survival and development of most less developed countries.

Agricultural development reduces rural poverty in several ways. Technological progress in agriculture, if on a neutral scale, directly increase the income of the small and marginal farmers provided they can secure access to credit, extension, training and modern inputs. Furthermore, it increases the demand for their labor and hence employment of the landless labors on farms. Besides, agricultural progress results in increased output which keeps food prices low for the poor and thereby gain an increase in real income.³ Higher productivity in agricultural sectors leads to industrial growth as the surplus in agriculture can be drained out for investment in industries.

Thus, increasing agricultural productivity is a major target for development almost everywhere. However, it is not only the quantity of food which matters but also its quality as it affects people's health, productivity and happiness. Too little food is itself a cause of mal-nutrition. Adequate quantities, however, if of deficient composition do not protect against mal nutrition. Deficiencies of iron and vitamin 'A' are also common and create serious nutritional problems. Mal-nutrition can and does lead to anemia, apathy, stunted growth of both mind and body. It makes its sufferers more subject to infection and disease and death. Malnutrition reduces the hours per day a person can work and even his efficiency because of lassitude and lethargy and this low productivity has the crucial effect on his ability to buy more and better food. The Food and Agricultural Organisation (FAO) reported in its World Food Survey that about 40 percent of the women in developing countries are anemic, because of malnourishment, and that up to 1,00,000 children go blind each year.

Each developing country faces this problem of food and nutrition. These countries must be concerned with the desire of its people to live happier as well as healthier lives, a desire which is met at least basically by the assurance of larger and better meals. Each developing country must be concerned not only with its capacity for growing food but also fibers in the forms of trees or grasses or cottons or hemp or sheep in the support of clothing, housing and even export as these are needed and desired in connection with its development programme.

The agricultural sector has a major contribution to a country's industrial development and to its economic development as a whole. As the agricultural community emerges from its traditional and largely subsistence form and begins to produce for the commercial market, its earning and its savings are major source of investment in industrial sector. In addition to supplying capital and raw materials, the agricultural sector makes labor available for industrial employment by releasing manpower when technology and mechanization reduce its own requirement for labor. Finally, and of exceeding importance in the development process, the agricultural sector provides the industrial sector with a market for both consumer and producer goods. Moreover agriculture depends heavily upon industry for energy, machines, fertilizers, pesticides and food processing and its supports industry by providing a growing market for these products and services of industry.

Thus, the agricultural sector is expected to make a major contribution to the welfare of the rural population. There is usually not a direct one-to-one relationship between a rise in the profits of farming and the economic or other happiness of all the residents of the farm community. Nevertheless, the growing productivity of agriculture is generally expected to play a prominent part in improving the condition of the rural population as a whole. Thus in several crucial ways - for food, for industrial development, for rural development, for eradication of poverty and for economic growth agriculture has a key role in development.

III.II ROLE OF INFORMATION IN AGRICULTURE DEVELOPMENT

In most of the developing countries, the quantity of land available to agriculture is fixed or declining. Again, a surplus of labor cannot increase the production from lands. Thus, neither land nor labor can boost agricultural production. Most observers then turn to technological improvement considering as the most promising path to agricultural growth. Example includes stationary threshers, mills and water pumps, tractors etc. In recent years, power tillers have been used for mechanizing puddling of rice fields. The increasing use of chemicals against insects and insect borne diseases has greatly boosted crop production. Pesticides are often crucial for preventing losses of high yielding crops. It can change insects immunities, destroy natural enemies.

There is also the spread of irrigation, high-yielding seeds and fertilizers. Half the increase in grain yields since 1950 is a result of increased use of fertilizer in combination with irrigation and modern seeds.

The emergence of genetic science in the mid -19th century and the establishment of publicly financed agricultural research centres have fostered scientific breeding and production. Plant selection and improvement take place today in hundreds of national and international centres forming a world wide network that share data, planting materials etc. At the frontier of genetic research, microbiologists are applying still more advanced technology to develop new or dramatically modified plants.

With the emergence of the concept of sustainable development in recent years, emphasis is given on the use of new technology which will increase agricultural production without damaging ecological balance. Sustainable agriculture is that which is ecologically sound, economically viable, socially equitable and humanitarian. In order to achieve sustainability in agriculture, there are some physical and social remedies which need to be adopted. Natural farming systems, utilization of urban garbage for fertilizers, use of livestock energy to improve the nutrient cycle of soil, tree plantation to improve soil structure and reduce soil erosion and multi-cropping system are some of the physical aspects which need proper attention. Nature has provided enough to fulfill our needs but not to fulfill our greed. There is need to use all natural resources very wisely. If an appropriate agricultural system is adopted according to land resource capability, any region will be able to fulfill their minimum needs.

So, to bring about overall progress in the field of agriculture, it is necessary to give information to the farmers about all these techniques and technologies boosting production. At the same time, the farmers must know the sources of information. Because, without detailed knowledge about the use of these improved technologies, farmers can not use them properly, otherwise it may be counter productive. Thus, there is the need for a wide network of communication which will give detailed and relevant information to the farmers. In this respects, it can be mentioned that, there are two broad ways, through which farmers may get knowledge about new inputs, new techniques of production and how to economies in production and marketing. These are: education and extension.

Education : The basic skills and education whether obtained in or out of school makes six types of contributions to agricultural productivity. First, the educated farmers have greater access to external information sources. They get information through correspondence or newspapers and by reading extension agency leaflets. It may also enhance contacts between farmers and extension agents. Education may mean easy access to the information giver as well as to the information. The second value of education, in the eyes of many authors, is its positive effect on allocative ability. Schultz notes that the economic return on having a post fourth grade education for boys is high because of increased allocative efficiency.⁴ In Whartm's language, "Mastery of the ability to think through the economic calculus is, I believe, most closely linked to the level of education."⁵ A third value of education is its tendency to enhance farmers' favorable attitude toward change, openness to new ideas and techniques. A fourth advantage said to accrue to better educated farmers is the ability to perform the detailed activities associated with operating a farm business such as keeping record of financial transactions and doing the budgeting. Herdt, suggests that a consequence of increasing levels of education in a populace is that it stimulates the research institutions and extension system to provide a more rapid flow of technology. In his view, "only when an education that views technology as a means to problem solving becomes widespread will rapidly changing technology be built into the system."⁶ Finally, it has been argued that in a better educated populace knowledge is more easily transmitted to all individuals in a community. If the larger unit is better educated, then those with less education are said to be benefited because of greater number of local peoples are capable of passing on new information.

Extension : The adoption of new technology depends on the knowledge, skill and motivation of farmers. It is the task of agricultural extension to transmit knowledge of better production methods to farmers and help them to overcome difficulties in applying them. An extension system may enhance any of the categories of farmer's efficiency: technical efficiency (how and what to plant), allocative efficiency (how to manage farm resources optimally) or innovative efficiency (how to obtain and use information). Agricultural extension "relates to the process of carrying the technology of scientific agriculture to the farmer in order to enable him to utilize the knowledge for better agriculture and a better economy. Agriculture extension service seeks to impart the necessary skills to the farmers for undertaking improved agricultural operations, to make

| <i>Country</i> | <i>Year of Origin</i> |
|----------------------|-----------------------|
| Pakistan | 1952 |
| United Arab Republic | 1953 |
| Netherlands | 1953** |
| Nigeria | 1954 |
| Taiwan | 1955 |
| Brazil | 1956 |
| Belgium | 1957** |

* Source : Axinn, George and Sudhakar Thorat, *Modernizing World Agriculture*, New York :Praeger Publisher, 1972

** Source : *Agricultural Advisory Services in Europe and North America. The organization for European Eco. Corpn. Paris, 1957.*

The size, structure and services of the extension organisation vary from country to country representing different economic conditions distinct levels of intensity of agricultural production and diversified educational, social, and cultural attachments of their people

Among the developed countries, America is pioneering in adopting the extension method. The American extension programme is popularly known as Cooperative Extension Service. The main objectives are to raise farm efficiency and income and thereby high living standard for the farmers, to impart farm and home oriented technical education and to develop leadership in the locality. The process of extension is like a two way traffic to take farmers' problems to agricultural research centres and transmit their results to farmers through audio visual methods. In the United Kingdom, Extension service is called the National Agricultural Advisory Service. It is solely concerned with agricultural extension and functions with local agencies like National Farmers' Union, National Federation of Young Farmers' Clubs and Women's Organization and the Government Agency of the Agricultural Department.

However, agricultural extension failed to make a significant impact on farmers in the rural areas on developing countries. In most of the developing countries the extension systems operate on bureaucratic principles. These systems are characterized by very strong hierarchy and deep organizational structures. Traditionally messages

followed unilaterally from sources at the top, namely the extension agency, to receivers at the bottom, such as the peasant farmers. The utmost emphasis is placed on convincing the farmer to adopt extended innovations, which becomes essentially pro-persuasive. It was apparently, taken for granted that extension personnel were well equipped both conceptually and operationally, to carry out the task of spearheading the diffusion of innovation. The adoption rates in the Third World nations were usually so low that they generally failed to create S-shaped adoption curves. This failure signifies that the innovations are failed to reach in rural Third World. The elements of the social - psychological constraints are familism, fatalism, limited aspirations, low empathy, low achievement, motivation, low innovativeness, lack of deferred, gratification etc. On the other hand, some development communication researchers hypothesized that the development constraints were not located inside the heads of peasants but outside in their environment. Field studies in the Third World showed that there were a great many external constraints inhibiting peasants for adopting new ideas. Some of them were economic, others political and still others associated with communication failures. The study suggested that, until these external constraints were removed, it was premature to posit social psychological sub cultural constraints. Several national governments in the developing world put together multi - package programmes to overcome such external constraints. The integrated approach to development attempted to introduce ecologically sound new techniques and technologies and revamped institutional structures for more efficient delivery of financial and material inputs necessary in the implementation of the new ideas. But this approach gave short shift to the communication constraint.

Thus, it is conceived that the constraints that prevented peasant farmers from making greater adoptions of innovations may not necessarily be only external. The fault may lie within the extension process. There seemed to be a lack of effective strategies for delivering adequate, reliable and relevant information, knowledge and skills to the peasant farmers. There are hardly any professionals trained to communicate effectively in the peasant idiom. It is because the institutions are not providing appropriate training. The extension system is non-democratic and one-way, usually from the industrialized western nations to most of the Third World, and within the individual countries, from the elites, such as scientists and government officials, to the peasants.

To overcome these problems, intensive agricultural extension programmes, like the Training and Visit (T&V) system of the World Bank has been introduced in 1974.

This programme attempts to provide accurate, research based knowledge to the ultimate receivers in a timely, regular and systematic way.

III.III AGRICULTURAL EXTENSION IN INDIA

The history of agricultural extension in India dates back to the early years of the 20th century. Among the earlier experimental Pilot Project undertaken in this field are Sriniketan Project (West Bengal - 1920) of Rabindranath Tagore, Martandam Project (Kerala - 1921) of Hatch (Y.M.C.A.), Gurgaon Project (Punjab - 1927) of Brayne, Sevagram Project (Gujarat -1936) of Gandhiji, Nilokheri Project (Punjab - 1947) of S.K. Dey Etawah Project (UP - 1948) of Mayer.

In 1920 Rabindranath Tagore laid the foundation of the Sriniketan Institute for Rural Reconstruction and formulated a programme for the all - round development of the village. The basic objective was to study rural problems and help the villagers to develop agriculture, improve the livestock, and improve village sanitation etc.⁸ It was an attempt to cultivate 'Total Man' by taking holistic view of life with full integration to cultural and material self. Besides the practical programmes for village upliftment, a youth movement called 'Vratachari movement' and 'Shiksha Satra' was also launched. There was marked improvement in the villages surrounding Sriniketan, but such examples were not multiplied due to lack of professional research support and government initiatives.

The Martandam experiment was started in 1921 under the leadership of Dr. Spencer Hatch. The purpose of the experiment was to bring about a total and meaningful development of rural life, spiritually, mentally, physically, socially and economically. Martandam, 25 miles south of Trivandrum, was developed as a demonstration centre to guide 100 young christian Missionaries in Martandam and 40 in the surrounding villages.⁹ This demonstration centre had a demonstration farm, animals, equipment for the honey industry and other cottage vocations within the campus. The local leaders were trained and actively involved. Rural surveys were conducted, dramas, exhibitions, melas and demonstrations were organized. Some local industries like weaving, poultry, bee-keeping were started on a co-operative basis. The Martandam experiment's main gains were the changes that it brought in the attitudes of the rural people, inculcating in them a desire to improve the spirit of co-operation and self respect. The experiment was

followed by other states and its workers helped the states of Baroda, Mysore, Cochin and Hyderabad to set up centres for training for rural reconstruction.

Mr. M.L. Brayne, who was the collector of Gurgaon District, conceived the rural development scheme in 1927. Brayne in his book 'Better Villages' spoke of rural reconstruction as "nothing more or less than the revival of the old - fashioned virtues of hard work, thrift, self respect, self control, self help, mutual help and mutual respect."¹⁰ The scheme was divided into many parts such as: institutional work, rural sanction, agricultural development, education, cooperation, social reforms, coordination and publicity. The contents of this programme were as comprehensive as those of the Integrated Rural Development Programmes. Brayne established schools of economics and domestic science to teach dignity of labor and self help. Intensive publicity through films, songs, dramas was undertaken with a view to increase farm yields and improve health standards. His great contribution was the creation of the "Village Guide" as a multipurpose worker representing the various departments of the Government at village level. Brayne's work, however, could not spread beyond Punjab, and it also disappeared soon after he was withdrawn.

Under the enlightened Maharaja of Baroda, a scheme of rural reconstruction was started in the year 1932. The Diwan of the state, Mr. V.T. Krishnamachari, who made his classic contribution in the Grow More Food Enquiry Committee (1952) and subsequently acted as Vice - Chairman of the Planning Commission, undertook the scheme taking lesson from the experience of Martandam and studying methods of extension and cooperation in Europe. Krishnamachari prepared and implemented a comprehensive programme of rural reconstruction, covering the various aspects of rural life. The programme included activities, like improvement of communication, digging of drinking water wells, anti malaria measures, pasture development, distribution of improved seeds, training in cottage crafts, establishment of panchayats and cooperatives covering every village, and development of village schools as centres for imparting teaching in agriculture and inculcating among the villagers the 'will to live better'. To meet the cost of the programme a trust of Rs.1 crore was created and in every district, intensive zones consisting of 20 to 25 villages were carved out. By 1942-43 there were 24 such centres covering 487 villages and in charge of these centres were graduate assistants to spread the messages.¹¹

Gandhiji also undertook the rural reconstruction activities in Sevagram near Wardha to implement his ideas of constructive programmes. It included use of Khadi, Promotion of village industries, removal of untouchability, basic and adult education, rural sanitation, uplift of the backward classes, the welfare of women, education in public health and hygiene, propagation of national language etc.¹² Gandhiji emphasized self - sufficiency in food and cloth. He was in favor of 'Gram Swaraj'. The individual was to be the centre of initiative which could expand and express itself in ever widening circles, beginning from local panchayat and heading towards a corresponding national organisation or supra - national organisation through various intermediate tiers. To him, moral values like truth, non-violence, self-restraint, dignity of work, fearlessness were the main means to achieve the ends.

The Gandhian philosophy was officially accepted by the government. The introduction of the Khadi and Village industry programme, acceptance of the notion of village self sufficiency and the faith in the 'Panchayati Raj' and 'Sahakari Samaj' movement are some of the examples of the impact of the Gandhian tradition on the working of the government. The 'Bhoodan' and 'Gramdan' movements led by Acharya Vinoba Bhave and late Jaiprakash Narayan were the contribution of Gandhian philosophy.

All these early attempts initiated the move in the direction of rural reconstruction. Tagore gave the holistic cultural approach, which is even today the genius of the Community Development. Martandam's extension services served as bases for inventing a complete inventory project of extension principles. Brayne's scheme was comprehensive in contents. He had already suggested the idea of a multipurpose functionary at village level. The ruling party drew inspiration from Gandhiji's ideology of rural reconstruction after independence and was deeply committed to it. The lessons learnt from all these trials formed the bedrock of the present CD and NES programme. However these attempts were not successful because they were isolated ones except the Baroda experiment. Each one of them worked independently without taking lessons from others. Their coverage was limited due to lack of adequate resources and technical support. The attitude of the government towards them was also unsympathetic.

The first government sponsored scheme was launched in Madras in 1946. The scheme was first introduced in 34 Firkas and later it was extended to 50 Firkas in 1950.¹³ The short term objectives of the scheme were to develop basic amenities and an

institutional framework for carrying out communication, water supply, sanitation projects and formation of panchayats and cooperatives. The long term objectives were to attain self sufficiency in food, clothing, and shelter, development of agriculture, animal husbandry, Khadi and Cottage industries. To achieve these goals a special fund of Rs.4 crores was created. The Director of Rural Welfare at the state level was put in charge of the scheme. The Collector was made responsible for implementing the scheme at district level. He was assisted by a Rural Welfare Officer who was in charge of two or three Firkas and had under him five to ten 'Gram Sevaks'. Junior staff in Agriculture and public works was also provided for every firka. Arrangements for training of 'Gram Savaks' were also made available. When the CD and NES programme was adopted by the state in 1953-54, the Firka Development Scheme was merged with it.

Nilokheri Experiment was another pioneering attempt which drew country-wide attention and influenced the CD movement directly. After independence near about 7,000 displaced persons were rehabilitated in Nilokheri town. The scheme was called 'Mazdoor Manzil' because it was based on the principle of "He who would not work, neither shall he eat." Rights for education and medical care for the sick were guaranteed. At the core of its activities were, it was a vocational training centre, run on cooperative lines, the colony had its own dairy, poultry, piggery, printing press, engineering workshops, tannery and bone-meal factory. People were given vocational training of their choice to run these cooperative enterprises. Nilokheri was seen as a symbol of progress through self help and mutual aid. It left an imprint on the Community Development Programme in the country. It gave the idea of agro-industrial town ship as the nerve centre of rural development and found place in the First Five year plan as well as in the lay out of the financial plan of the first 52 community projects. It is still an eminent centre for imparting training to various kinds of development personnel and is rightly looked upon as a place of pilgrimage for development workers.¹⁴

The Etawah Project was the forerunner of the first series of Community Projects in 1952. It preceded them by four years and set the pattern for the community projects to follow. The Etawah Pilot Project was conceived by Mr. Albert Mayer in 1948 for the development of the rural areas of Etawah district in U.P. The main objective of the Project was: "To see what degree of productive and social improvement as well as initiative, self - confidence and cooperation can be developed. The problem was to ascertain how quickly these results may be attained and remain permanently a part of the

people's mental, spiritual, technical equipment and outlook after the special pressure is lifted."¹⁵ In Etawah District, Maheva Block with 97 villages was selected for intensive operations. To train in agriculture and extension, VLWs were selected with great care. In carrying out various activities like agricultural demonstrations, soil conservation, improvement in animal husbandry and village sanitation, the cooperation of various departments and non-official agencies was secured. A programme of social education was initiated to secure people's participation. The main features of its organizational net were: a multipurpose worker at village level, coordination, team approach, a panel programme and regular follow-ups. The project was successful in achieving its aim and in three years it was extended to 300 villages of the Etawah district in U.P.¹⁶ An important contribution of Mr. Mayer in administrative reorganization was the practice of "Inner Democratization." By this he meant warmth in interpersonal relationship, restraining arbitrary determinations and wide consultations through systematically conducted staff meetings and other administrative methods to bring about coordination between the technical and administrative personnel.

All these earlier experiments in rural reconstruction at different places at different times generated inspiration among our planners and provided valuable guidance for them to frame a rural reconstruction scheme on a national scale. The influence of Etawah Project in particular was most dominating. The impact of this experiment did not remain confined to Uttar Pradesh only but was manifested in the scheme of 'Community Projects', which has figured so prominently in the successive Five year plans.

The Fiscal Commission (1949), set up by the Government of India, observed: "In our view the greatest need at present in India is an Extension Service with the object of bridging the gap between research and practices of producers . . ."¹⁷ Subsequently, the first effort to spread the work on an area basis was started with the Grow More Food Campaign. Although the campaign was launched in 1943 in the wake of the Bengal famine, it did not make much head way until 1947. It was a growth oriented programme launched to stimulate cultivator's interest in increasing crop yield per hectare. Field demonstrations and contact with the farmers to introduce the improved technique and initiation of a dialogue with villagers was the main focus in the campaign. Field staff was strengthened for this purpose. However, the campaign developed certain snags, and therefore, the Government of India set up an enquiry committee to examine the working of the GMF campaign in 1952. The Grow More Food enquiry committees found that, all

aspects of village life are interrelated, and no lasting results can be achieved if individual aspects of it are dealt with in isolation; and the movement touched only a fringe of the population, and did not arouse widespread enthusiasm or become in any sense a national programme.¹⁸ The enquiry committee further elaborated the concept of extension service and recommended the setting up of an 'extension' service for undertaking intensive rural work which would reach every farmer and assist in the coordinated development of rural life as a whole. It was out of this background and experience that India's Community Development Programme (CDP) was born.

The Community Development Programme (CDP) was formally inaugurated on 2nd October 1952. Initially, the CDP was launched in 55 project areas. Each area embraced approximately 300 villages, with a population of about 2,00,000 people and was administered by a team of officials comprising of Subject Matter Extension Officer (s) and about 30 Multi Purpose Village Level Workers (VLWs). The central objective of the CDP was to secure the total development of the material and human resources of rural areas, and to develop local leadership and self governing institutions. The basic idea was to raise the levels of living of rural people through a number of programmes related to agriculture, communications, education, health, housing, supplementary employment, training and social welfare. The emphasis was on a rapid increase in food and agricultural production by strengthening programmes of resources development, by improving the effectiveness of farm inputs supply systems, and by providing agricultural extension services to farmers. A year later, the project was supplemented by a new scheme called National Extension Service (NES - 1953). It was stated that the NES was introduced as an agency and Community Development as the method to bring about transformation in two broad areas: extension education and community organization.

The Fiscal Commission and the Grow More Food Enquiry Committee first gave official recognition to the desirability of setting up a NES. To act as an agent of all development departments and to advise the farmer in matters relating to agricultural practices, the commission recommended for the creation of a post of an Extension officer, with necessary staff, for a group of 40-50 villages. The committee for the constitution of a National Extension Service proposed the following organization patterns.¹⁹

a) For a developmental block, the Taluka or tahsil consisting of 100-120 villages could be a convenient unit. It could be further divided into 12 circles, each consisting of

a group of 5-10 villages and placed under the charge of a Village Level Worker (V.L.W.) who was to be the joint agent for all development departments. To impart lessons of research and arrange supplies and service needed by the farmers and also render first aid in case of animal and plant diseases was his basic duty. A team of consisting of the Sub-division revenue officer and other officers in agriculture, animal husbandry, co-operation and engineering was to be posted in each block.

b) As represented by local self-governing bodies of corresponding levels and members of parliament and state legislature from the area, the non-official leadership was also to be attached at taluka and district levels. Panchayats and Co-operatives were to be recognized as agents for the implementation of the local plans. The farmers were to play an important role in forming the programmes.

c) A non official board of State level and an All India Council of Rural welfare to discuss the progress of work and advise the Government on all matters relating to village development was also suggested by the committee.

d) The expenses were to be shared on fifty - fifty basis. The whole country was to be covered with the network of Extension Service Block within a period of 10 years.

It was stated that the NES was introduced as an agency through which the Five Year Plan sought to initiate the process of transformation of social and economic life of villagers. However, the implementation of this programme became very defective due to non - availability of technology and technologists, quick change in emphasis, lack of trained personnel, lack of motivation amongst functionaries and problems of co-ordination at different levels. Innovations were also relatively infrequent and often induced by exogenous factors instead of being a continuous process resulting from a constant exposure to organized research and development effort. There was no purposive and organized application of science and technology which could maintain continuity in striving for innovations. It was emphatically stated that there was only 'Fictitious Paper Participation' rather than 'Functional People's Participation'. The alarming shortfall in food grains production during 1957-58 and the rapid trends of rise in population compelled planners to focus greater attention on examining the lacunae in the approach and reorienting the programme for agricultural extension.

The Government of India appointed a Study Team of Ford Foundation in 1958-59 to make definite recommendations for rapid growth of agriculture. The Team suggested ways and means to achieve self sufficiency in food and recommended that

agricultural extension programmes should be based on local conditions, village production problems and village potentials. This was followed by launching Intensive agricultural District Programme and Intensive Agricultural Extension Programmes (I.A.D.P and I.A.A.P.)

Intensive Agricultural District Programme (IADP-1960) popularly known as package programme, consisted of collective and simultaneous application of all improved practices and services including, improved seeds, fertilizers, irrigation, plant protection, credit implements etc. The objective of IADP was to choose a few districts (originally 7, later 15) [Two districts later fell out of the Programme, making 13 in all] to evolve a dynamic pattern of productivity which could be extended to other places. In these Intensive Districts the Extension Staff were increased - the V.L.W from 10 to 20 per Block, the A.E.Os from 1 to 4 per Block. A highly selective team of Subject Matter Specialist (technical team of experts including farm management specialist at district level) was constituted for technical guidance and to guide the programme. Farm information units were established to provide intensive information support to IADP. Large scale extension techniques along with monitoring and evaluation system were used for the first time.²⁰ The concept of IADP revolved round the process of developing and executing 'Farm Production Plan' along with full scales supplies, services, credit and input management. This Programme later was modified as crop- area- oriented programme known as Intensive Agricultural Area Programme (IAAP). Both the programmes made a great stride and significant beginning because for the first time a fairly large proportion of cropped area in the country possessing adequate production potential was brought under intensive production efforts.

However, the programme as a whole did not work well. Because, it did not concerned about the development of new technologies or the addition of non-irrigated area or the training of the personnel, which facilitate the transformation of production functions and quicker the increase of output and capital formation in agriculture. As a result IADP was equally effective and equally ineffective in motivating cultivators to expand crop output and yield.²¹

As a result of IADP and IAAP experiences, and drought and severe scarcity in 60's, it was felt that there was an urgent need for developing and evolving cost-reducing high - yielding agricultural technologies which can easily match the scarce inputs and limited resources. The Indian Council of Agricultural Research (ICAR) in collaboration

with Agricultural Universities and state Departments of Agriculture launched various programmes both as a concern to technological testing in the field and to get a 'feedback' for the scientists. Moreover, grant-in-aid is sanctioned to various research organizations and universities in the state to conduct high priority research activities. At the same time, ICAR also established Trainers' Training Centres (TTCs), Krishi Vigyan Kendras (KVKs) to teach the science of agriculture to the trainers and the farmers. Some of these programmes are: National Demonstration (1965), Operational Research Programme (1971) and Lab to Land programme (1979).

But the problem with all these efforts are that it is one way communication, absence of single line control; lack of proper supervision; inadequate and improper training; no updating of knowledge in service; lack of specialization of staff; low level of linkages with research and other. Considering the earlier efforts and limited resources of the country the Government of India took advantage of World Bank assistance, so as to accelerate the process of development and reorganize the extension system.

With the assistance of the World Bank, the agricultural extension set-up was reorganized on the basis of what is called the Training and Visit (T&V) system. The basic objective of this new system is the establishment of an effective link between farmers, Professional extension workers and researchers. The new extension is based on continuous training of all categories of extension staff and their regular and well scheduled visits. The other salient features of T&V system are: a) to build a professional extension service that will be capable of assisting farmers to raise production and increase their incomes and of providing appropriate support for agricultural development. b) To bring the extension service under a single line of technical and administrative command. Support is required from teaching and research institutions, and other agricultural organizations but all extension workers should be responsible administratively and technically to a unit within only one department. c) Extension staff to work only on agricultural extension and not to spread their efforts over a wide range of other activities like supply of inputs, data collection, distribution of subsidies or other activities not directly related to extension. d) To teach and train the contact farmers (CFs) and through them the other farmers to make the best use of resources available to them. The extension workers must make regular and timely visits to meet the agricultural difficulties. e) To arrange regular and continuous training of extension staff to enable them to convey useful production recommendations to farmers. f) To establish two way

linkages between research centres and extension workers which would help the research scientists to formulate production recommendations suited to the specific local environment and farmers' resources.

The major problems that the T&V system hopes to overcome are: a) lack of a single line of command; b) dilution of efforts by assigning a multipurpose role to field extension workers; c) Excessively large areas of operation; d) Lack of regular training for updating knowledge of extension workers; e) lack of proper ties with research; f) duplication of extension services by various agencies of development.²²

Under the T&V system, there is effective coordination between research, training and extension activities and optimal utilization of human power to ensure maximum coverage in rural areas. Under this scheme, the transfer of package of knowledge and skills from research stations to farmer's fields is achieved in two steps: the first step provides for systematic, time bound and location specific training of village level extension workers (VLW), the extension functionaries responsible for meeting with farmers. The second step ensures transfer of the new knowledge and skill from VLWs to farmers through regular, pre-scheduled visits.²³

The T&V system is based on the assumption that it is rather impossible to maintain regular contact with most of the farmers directly, which is neither necessary nor desirable. Hence, selected messages have to be focused mainly on selected contact farmers, who will assist in spreading the new practices to most farmers in their area very quickly. It is assumed that the contact farmers must be willing to try-out practices recommended by the extension workers and be prepared to have other farmers visit their fields. The advice to contact farmers will thus be diffused and spread to other farmers, through the well knit communication system in the rural area and through the process of dissemination and diffusion.

The fundamental approach in T&V system is a systematic and problem oriented programme of training of the VLWs, combined with frequent and well planned visit by them to the farmers' fields. The step I 'Training' ensures transfer of know how from the research scientists/SMSs to the field level extension agents and step II 'Visits' ensures transfer of know how from the extension agent to the contact farmers and down to the other farmers in turn. The training develops better understanding amongst extension agents about the technological components which enhances their self confidence and

results in further convincing the farmer and / or target beneficiaries. Once this cyclic process starts it becomes 'reinforcing' and 'self propelling' type.²⁴

The T&V system has an inbuilt mechanism for monitoring and continuous evaluation of the performance and finally the impact on the beneficiaries. At the national level the Directorate of Extension under the Ministry of Agriculture monitors the extension activities and at the state level special monitoring and evaluation cells have been created for this purpose. The main indicators for monitoring are: the number and frequency of visits of VEW to contact farmers, the regularity and quality of fortnightly training and monthly workshops; the extent to which the recommendations made by VEW are adopted by the farmers; and the yields obtained by the farmers in the project area.²⁵ The evaluation studies are conducted before, during and after stages of implementation of the extension activities/project. An appropriate representative sample is drawn at two stages viz. dividing district level farmers into group and then selecting suitable sample from these groups within the categories of contact as well as non contact farmers. This is followed by administering pre-structured, pre-tested and an integrated questionnaire consisting of basic set of questions, both for early and repetitive studies. Moreover, the assessment of impact is also judged by crop cutting experiments.

The T&V system has resulted in increasing the cultivated area under High Yielding Varieties Programme, disseminating new knowledge of farming for increasing the crop intensity, increasing employment of family labor, raising marginal value of productivity of all inputs, and accelerating the extent of adoption of recommended practices. It is also assumed that there is more impact of this system on the small holdings as compared to large ones. Thus, T&V system has a considerable positive impact on the farming economy.

The T & V system has been in operation in major states since 1977 on a large scale. The process was complemented by two broad projects called National Agricultural Research Project (NARP-1980) and National Agricultural Extension Project (NAEP-1983) under the T&V system wherein the Universities and Research Institutions have an important role to play, the NARP is a major effort of the ICAR in this direction to upgrade and strengthen the regional research capability of the State Agricultural Universities to conduct location specific, production-cum-problem-oriented researches in the various agro-climatic zones. To perform a matching role with well expanded research system, the National Agricultural Extension Project (NAEP) has been launched to

strengthen location specific and problem cum production oriented extension service in an agro-climatic zone. Both NARP and NAEP are striving to achieve the objectives of linking research and extension activities from the State level to the grass root level. The two giant viz., NARP and NAEP together expected to overcome various organizational, structural and functional constraints that have been identified during the operation of T&V system.

III.IV EXTENSION EDUCATION IN AGRICULTURE IN WEST

BENGAL

West Bengal has got about 8 percent of India's population and not less than 3 percent of the country's total land. Again in West Bengal, nearly 80% of population depends on agriculture and allied occupation. While 60% of the employment of the state is in agriculture and related sectors, 50% of total state income comes from agriculture. In spite of the importance of agricultural sector in our economy, the investment of capital in agriculture is very meager as compared to that in industry.²⁶ Facilities for creation of permanent assets for increasing agricultural production are also not adequate. Thus to meet the requirements of food for the ever increasing population, to alleviate rural poverty and to ensure supply of raw materials for our industries, intensive agricultural development by way of providing irrigation facilities to existing land under cultivation, supply of improved seeds in adequate quantity at fair price, applying of improved fertilizers is seen as the alternative to limited land use. Besides, to improve agricultural production, various types of need based agricultural research are also regarded as formidable requirements.

The adaptive research wing of the Agriculture Directorate with the financial assistance from State and Central Government, Indian Council for Agricultural Research (ICAR) is undertaking serious need based researches for improved agricultural practices. Moreover, grant-in-aid is sanctioned to various research organizations and universities in the state to conduct high priority research activities. At the same time, in order to improve the agricultural production, special attention has to be given to ensure regular flow of highly productive recommendations, based on research findings in research stations, to farmers through a well planned extension system. An effective linkage between Research and Extension wing is an essential element for adoption of new

technologies. The extension system will give detailed information regarding new innovations to the farmers and motivate them to use these technologies appropriately. If the farmers do not get information about the ways of adoption of innovation, the effort will be counter productive.²⁷

The success of intensive agricultural development programmes depend largely on extension publications such as folders, leaflets, charts, posters and technical bulletins etc. The information wing of the State Department of Agriculture produce seasonal extension publications on different crops and agro techniques and distribute them among the farmers and extension workers. In addition to these, extension support is rendered through mess media like the radio, newspapers, agricultural journals, discussion groups, TV etc. The agricultural policy of the Government and information on various technologies are published in the departmental monthly journal 'Basundhara' and quarterly journal 'Sar Samachar'.²⁸

But, the problem with all these efforts is that it is one-way communication. In order to make communication effective, there is the need for two- way communication where both farmers and extension agents can interact with each other. In West Bengal improved extension services i.e. T&V system of extension was introduced in 1974 and in North Bengal it was 1977. The T&V system of agricultural extension aims at the establishment of an effective link between farmers, professional extension workers and researchers. The transfer of technology required a network of extension service involving officials at the state, district, and block and down to the village level.

STRUCTURE OF T & V SYSTEM

The extensive service under the agricultural Training and Visit system is carried out in a simple, scientific and organized way in West Bengal. At the bottom of the system, there are KPS to interact directly with the farmers. Generally for every ten villages there is one KPS to take agricultural messages to selected contract farmers. One Agricultural Development Officer (ADO) trains and looks after 6-8 KPS.

Again 6-8 ADO work under one Sub-divisional Agricultural Officer (SAO) who is assisted in his work by a Subject Matter Specialists. A Principal Agricultural Officer (PAO) is appointed to supervise 6-8 Sub-divisional Agricultural Officers. The PAO is also assisted by a group of subject matter experts. Above the PAO in the administration hierarchy there are Joint Directors one for each range and at the apex there is the Director of Agriculture at the Headquarter. The structure of the organization thus hierarchical and an effective system of coordination and control is established. The officials are empowered to make necessary changes and alternatives in policy directives in course of implementing the programmes.

One of the basic requirements of the effective agricultural extension is that extension messages must reach quickly and regularly to as many farmers as possible. In order to ensure this Krishi Proyukti Sahayak (KPS) are supposed to pay pre-arranged visits to farmers at regular intervals. During these visits, the KPS will convey production recommendation, he is informed of in fortnightly training sessions, teach the farmers about the skills and techniques required for following the recommendations, and motivate farmers to have a trial of the practices on a small piece of land. To make the visits fruitful and effective, it is extremely important to define carefully and correctly the area to be covered by the KPS-the 'Circle' and the grouping of farmers within the circle. Good extension is not possible if a circle or farmers' group is too large to be covered by the KPS effectively. However, the number of families to be covered by the KPS varies depending on the nature of agricultural land, the effect of prime agricultural seasons, the tenancy system, the transport facilities available, the density of population of the area, types of crops and the system of cultivation. There is no hard and fast rule regarding the maximum number of agricultural family to be supervised by one KPS. Generally, the number is determined after considering the situation and field carefully and the experiences of the KPS. Where the density of population is high, many small families live together and cultivate a few number of prime crops, the number of KPSs are generally kept in the ratio of 1:800. In area, where the farmers are very much competent, the ratio may be 1:1200 or more than that. Again in thinly populated area where people live scattered the ration may be 1:500. In hilly areas which are mostly inhabitable the ration is generally 1:300.²⁹

Once the KPS: farm family ratio has been determined, the next step is to demarcate the circle of operation for KPS. A circle is divided in eight parts according to

situation of agricultural land, area of village and transportation facility. The number of farm families in each of KPS groups need not be exactly the same; it may vary from 60 to 120. KPS selects 10 agricultural agents for every part in consultation with prominent members of the village and according to his acquired experiences. The SAO ensures all participants and selects the training location. He is also responsible for arranging the necessary teaching materials and aids. He is helped by the Subject Matter Specialist (SMS). SMSs are the principal trainers. The trainers work as a team and production recommendations for each crop are presented according to lesson plans. Such a plan is a written statement containing an outline of the specific topic, including the lesson's aim and materials and teaching aids required. If a practical skill needs to be taught in conjunction with the topic, the lesson plan covers this also, indicating the place where the practical training will be held. At least three days before a training session, a SMS is expected to complete a lesson plan for each topic he will teach. The lesson plans are reviewed by the SAO. At that time AEOs are also actively participating in training, both to report on field conditions and to learn production recommendations and to ensure that the KPSs under their jurisdiction are able to understand the messages properly and acquire through practical work the skills necessary to implement them. In addition, AEOs help the SMSs to identify the KPSs who need special attention. The KPSs participating in the training programme get in detail the practical training which is to be recommended to the farmers during the coming fortnight.³⁰

Given the important role of Subject Matter Specialists in the Training and Visit system of agricultural extension, there is also a system of monthly workshop to provide in- service training to the SMS. Apart from their initial professional training at village, which is central to the circle, the Agriculture Development Officer is expected to supervise and guide 6 to 8 KPS in a way similar to that followed by the KPS with regard to his supervision and guidance of farmers 'group'. He visits each of his KPS regularly at least once a fortnight.

TRAINING OF EXTENSION WORKERS

At the village level, each KPS is trained every fortnight to take productive recommendation from the agricultural experts. All KPS participate in one day training each fortnight. The fortnightly training is the chief means of continuously upgrading the professional skills of extension workers. Effective extension work depends on good regular training as it is mainly through this training that KPS learn the specific relevant

recommendations which will be discussed with farmers during the coming fortnight. Without these recommendations, their visits are likely to be generalized and undirected and so of little use to farmers.

Fortnightly training are held at regional research stations, departmental farms, farmers' field or sub-divisional offices, depending on facilities available in the sub-division and required for a particular session. The number of KPS participating in training should not be more than 35. Fortnightly training is held twice in a month on the same date in each month. Where there is more than one training group in a sub-division, the training days of each group must be different since the trainers i.e. Subject Matter Specialists (SMSs) are to be the same for all the groups in a sub-division. Moreover there are intervals between training sessions which are utilized by the SMSs for field visits in order to review problems faced by the KPS and to see the efficacy and effectiveness of the extension staff in presenting the recommended messages to farmers. The Sub-divisional Agricultural Officer is the organizer, convener and leader of all fortnightly training session held in his sub-division. Given the important role Subject Matter Specialists in the training and visit system of agricultural extension, there is also a system of monthly workshop to provide in service training to the SMSs. Monthly workshops are arranged at the district level. The maximum numbers of participants are 35. The workshops preferably should be held at a research station. If suitable research station is not available, an Agricultural University or Department of Agriculture seed farm with appropriate facilities may be chosen for the purpose. These facilities must include adequate land nearby for practical work. Two full consecutive days are required for a workshop. Participants must have two full days to discuss clearly the topics presented, do practical work, and identify field problems and impact points for the next two fortnights. It is the sub-division and district level SMSs and the Zonal or Regional Director, the District Agricultural officer and Sub-Divisional Agricultural Officers and Assistant Sub-divisional Agricultural Officers, who are generally the participants of the workshop. The trainers normally come from state agricultural Universities and their Research Stations and the Department of Agriculture. In addition to the main cadre of trainers, 'guest trainers' for specific topics are also invited. Guest trainers include SMSs, Department staff and even farmers who are familiar with particular topics.³¹

VISIT OF EXTENSION WORKERS

A key feature of the T&V system of the agricultural extension is the fixed, regularly scheduled visits to farmers' fields made by extension staff. Although field visits are undertaken by all extension workers, including extension staff at the headquarters and zonal levels, it is the Krishi Proyukti Sahayak (KPSs) whose visits are assumed as the most significant in the T&V system. The purpose of the visits is two fold. One is to present to farmers, and encourage them to adopt, agricultural practices and innovations that are most relevant to the optimal use of their resources and skills for increasing their incomes. A second purpose is to enable extension staff and through them, researchers to be closely and continuously acquainted with farm conditions and problems so that extension recommendations and agricultural research are relevant to actual farmers' needs.³²

The KPS visits each of the eight groups in his circle for a full day one in a fortnight. Since it is not possible for the KPS to establish and maintain frequent contact with all farmers directly, he selects 10 farmers as 'contact farmers' before the commencement of his visit. The contact farmers are selected by the KPS in consultation with members of the village panchayat and according to his acquired experiences. A contact farmer is selected as one who can give leadership to other farmers in his group and is able to motivate others in imitating him. The KPSs in their interaction with contact farmers must keep in mind the basic requirements of the T&V system and work accordingly. The KPS should visit apart from the contact farmers of the group concerned, contact farmers of other groups if available. In the field, the KPS should invite as many other available farmers as possible to come and participate in the discussion and hear the recommendation. The contact farmers should be encouraged to explain the recommendation to the other farmers reviews the responses and willingness of contact farmers in adopting recommendations and guides the KPS on how to achieve more effective support from them and other farmers. With the KPS and AEO, Sub-divisional Agricultural Officer (SAO) also spends at least three days each week in field visiting farmers, KPSs and AEOs. He reviews two main points-First the KPSs make regular fixed visits to farmers' fields and secondly, that the messages given to farmers are relevant to them. The SMSs of all levels (sub-division, district and headquarters) also spend at least one third of their time in field visits. Field visits made by SMSs are of two main types. One is to examine field problems brought to light at fortnight training

sessions or monthly workshops, and to see if their recommendations are being followed correctly by KPSs and farmers. A second function of a field visit is to review local farm production practices and constraints. Such visits are as important as the problem solving visits because these help the SMS to make research more relevant and need based. Though the visits of AEO, SAO and SMS are not the compulsory job, but their regular field contact gives them useful insight in the T&V system of extension.

EVALUATION & MONITORING OF T&V SYSTEM

An Evaluation and Monitoring unit has also been established under this programme. Monitoring and evaluation is a management tool that helps the extension service operates efficiently, enables management to take necessary corrective.

KPS visits his circle according to his fixed schedule. The days for meeting the groups of the circle are kept fixed. A new fortnight begins each alternative Monday. The fortnights are calculated according to the days of the week and not according to the date or the month. The Visits are field oriented. The time of visit is generally when the farmers are in their field, and it varies with the seasonal changes. In summer, the most suitable time for visits may be 7 to 11 am and 4 to 6 p.m. In winter, the time may be from 9 a.m. to 5 p.m. On each visit, KPS meets as many contact farmers as possible. He goes to the fields of as many contact farmers as possible so that other farmers may come and meet him. In this way KPS meet with selected groups (eight) in his circle at the rate of 4 days in a week and 8 days in a fortnight. After the visits to farmers's field in the morning or afternoon, sometimes the KPS holds a meeting with the farmers. To ensure the regular supply of information, KPS have to live in his own field. In order to remove their housing difficulties in the rural areas, quarters are being built up. KPS are also being provided with loans to buy bi-cycles in order to ease his movement.

Apart from KPS, the other extension staff also makes field visits. The immediate supervisor of the KPS, the Agricultural Extension Officer (AEO) spends eight days in each fortnight for field visits. The purpose of his visit is to see that the recommendations are presented by the KPS to the farmers and thus to extend support to KPSs in their efforts of persuasion and motivation. The AEO also monitor the action or shortcomings in extension operations. The monitoring of extension activities consists of timely gathering and analysis of data on the build up of the extension service and on its performance, as well as farmers' acceptance of extension advice. Evaluation assesses the

overall effects of the extension service on production and farmers' welfare in order to determine the degree to which the extension service is reaching its economic, technical and social targets.

Monitoring and evaluation of extension involves three main activities. First, routine monitoring of the implementation of extension activities focuses on the staff appointments, training activities, equipment and civil works in all areas in which both physical and financial progress is monitored. Secondly, monitoring and evaluation of field activities and the impact of extension through field surveys that focus on KPS visits, extension recommendations and crop yields. Data on field activities and impact are collected through sample surveys conducted and analyzed by staff of the monitoring and evaluation unit. There will normally be one monitoring survey early in a season and a monitoring cum evaluation survey tied to the seasoned crop cutting survey at harvest time. Besides these two, special studies may be conducted to focus on particular parts of the extension system.³³

Before 1995-96, it was the Bureau of applied Economics and Statistics (BAE&S) which estimate the total production in a particular season. But recently, the Government of West Bengal to get reliable statistics on agricultural production has introduced a scheme, called Establishment of an Agency for Reporting Agricultural Statistics or EARAS at the block level. Under this scheme, the average production of 20 prime crops of the four agricultural seasons in a particular year is calculated by KPS. This calculation of what agricultural yield helps to find out the efficacy of the new technology in increasing the productivity of the agricultural land as well as the effectiveness of extension service.

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