

## **ARD 504**

### **INTRODUCING TECHNICAL CHANGES IN AGRICULTURE**

#### **1. Social Change**

##### **Meaning of Social Change**

Social change pervades all aspects of societal life and may manifest as:

1. Economic change: This occurs in the areas of production, economic relations and statuses of people.
2. Political change: This refers to change in the distributions and operating mechanisms of social and political power within the social system.
3. Technological change: This refers to ways of applying scientific and organized knowledge to practical task.
4. Cultural change: This refers to changes in the non-material aspects of culture.
5. Behavioral change: This relates to the changes arising from the influence of education on the attitude and overt reactions of people.

#### **2. Sources of Change in the Society**

The sources of social change in the society could include:

- i. Urbanisation.
- ii. Governmental policies.
- iii. Adoption of science and technology.
- iv. Natural physical forces.

### **3. Factors influencing Change in a Community**

- i. Migration and population changes
- ii. The culture and structure of society
- iii. Physical environmental factors
- iv. Influence of leaders
- v. The attitudes and values of the people
- vi. Needs of the people
- vii. Relative isolation and contact
- viii. The cultural base

### **4. Basic Strategies for the Development and Transfer of Technology**

The following are three conceptual strategies for the development and transfer of technology:

- a. **Trickle down strategy:** This strategy assumes that if a better idea at solving a given is discovered, the farming population will immediately accept it. Examples are use of condom, chemical fertilizer (**NPK**) and yam mini-set.

This strategy also assumes that if the new technology meets the content criteria within the scientific discipline, then the intended clientele will certainly accept it without question. Therefore, most researchers concentrate on decisions related only to the content of new technology. Similarly, University departments and for the most part, government ministries are organized along subject matter/discipline lines – agriculture, health, etc. This strategy has been found to be ineffective. It does not consider the many influences outside the technical discipline. This model is also known as the 'push-strategy'.

b. **Planned research and dissemination strategy:** Due to the defects inherent in the trickle down strategy, two new elements were added to it by technology workers. First, they recognized a need for adaptation of discipline-oriented basic research in order for the clientele to be able to use the technology. The second new element is persuasion and mass dissemination designed to persuade the intended clientele to accept and use the new technology.

c. **Popular participation strategy:** There has been suggestion about popular participation in the planning and implementation of research programmes. The usual definition of popular participation is that the intended clientele is actively involved in the decision-making process in planning and implementing research programmes.

In practice, the popular participation strategy (or pull strategy) is impossible to implement in any large-scale programme for the development and transfer of technology. It is not possible to operate such extensive communication networks between the many clientele and the researchers. Secondly, the intended clientele in the rural (or urban as the case may be) lack the sophistication, confidence or desire to take active part in planning and implementing programmes.

## **5. The Need for Participation**

The generation and transfer of new agricultural technology in many developing countries is characterized by a top-down approach with the marginalization of the peasant farmers in the vital decision-making process. Hence, this has led to the development and transfer of technologies and ideas that are quite incompatible with farmers' production

environment. Consequently, the much expected production increases from the adoption and use of new ideas by farmers have not been realized.

However, facts have shown that formal institutions of agricultural research and extension around the world are not the sole agents of innovation and dissemination. Most agricultural technologies in use in the world today were developed and diffused by farmers. Farmers are innovative and always seeking to adapt to the changing demands of their environments, which is variable in time and space.

Due to the realization of the innovative behaviour of peasant farmers, there are calls for involvement of local people in programmes or interventions that seek to improve their social-welfare. This will afford the researchers, through participatory process, the opportunity of utilizing the Indigenous Technical Knowledge (ITK), in developing technologies that would be sustainable and acceptable to the local people.

Working with the local farmers can be advantageous in such respect as:

- a. Scientists can learn the prevailing conditions existing in farmers' field, so that the information could be used for screening technology more effectively.
- b. Learning the survival techniques adopted over the years by farm families. The survival techniques have ensured the continued subsistence of the farmers. But scientists in time part have derided such as "sub-optimal".
- c. The predominant problems and constraints as faced, and defined, by the farm family.
- d. Farmer reaction to research trials by finding out what they think of the technological interventions, as well as their reasons behind these reactions so that trials can also be evaluated using farmer criteria.

- e. The importance of women, the elderly, and children, in the various aspects of agricultural production cycles; and in household agricultural decision-making process.
- f. Farmer field innovations, which researchers and extension workers may be able to multiply throughout the area or transfer to another similar agro-climatic area, with or without minor adaptations.

## **6. Participatory Methodology**

### **Rationale**

1. Farmers continuously conduct their own trials, partially adopt and adapt technologies to their specific circumstances and spread innovations through their networks.
2. There are significant differences between the procedures of farmers' and research station experiments and their criteria for assessment.
3. Farmer experimentation is quicker and more able to accommodate changing circumstances and diversity than those of research scientists.
4. Farmers' own analysis of farming systems offers important insights, different from that of scientists.

Rapid rural appraisal was tailored towards active learning from the people, data gathering, and analysis.

### **Principles**

5. Reversal of learning: Learning from local people, not just mere transmission of knowledge to them.
6. Rapid and progressive learning with the emphasis on flexibility and adaptation, not blueprint learning.

7. Offsetting biases: particularly the centralist biases of rural development tourism.
8. Optimising tradeoffs: between quality, relevance accuracy and timeliness.
9. Triangulation. Learning from several sources and disciplines.
10. Seeking the expression and analysis of complexity and diversity (emphasizing variation over statistical averages and norms).

### **7. Core principles of participatory rural appraisal**

The core principles are tailored toward involving the people in data gathering, analysis and interpreting the data.

1. “Handing over the stick”: surrendering authority to local people in learning processes.
2. Self-critical awareness: critical examination by and of facilitators of their own roles and learning.
3. Personal responsibility: use your own best judgement at all times.
4. Sharing of ideas and information. From these principles has gradually emerged the view of PRA not just as a useful research methodology, but also as a way of stimulating a more general process of political change and empowerment.

### **8. The Concept of Target Population (Clientele Targeting)**

The conventional diffusion research assumes that the target population is homogenous in nature. This is not the case. The farming population are never perfectly homogenous. Homogeneity must always be determined to the purpose of the planned intervention, that is, target audience (that has the need) must be carefully identified and segmented.

The following reasons can form the basis for heterogeneity in a farming population.

1. Psychological characteristics: Farmers differ in the extent to which they are intelligent, keen, or interested, and in the extent to which they need to excel. There is no denying that people are born different with respect to mental powers and ability to make an effort to succeed.

2. Life cycle differences: Farm households differ according to age of children, role of children in the farm enterprise, which could influence/or relate to the progressiveness of farmers and the search for expansion of the farm enterprises.

3. Group norms: Societal norms and values play crucial role in the adoption of technical innovation. Norms sometimes aid the dissemination of technologies among the people, while in other cases it inhibits the people from accepting new technologies. Some farmers belong to highly dynamic groups with norms that foster change and innovativeness. Leaders will be chosen for their ability to guide the change process. In other groups, leaders are sometimes selected for their embodiment of traditional values.

4. Access to resources: Access to land, capital, inputs, credit, etc. determine to an extent whether a particular innovation is possible. Most innovations require resources, in terms of investment and credit, labour, or and land. Even using the same quantity and mix of resources in a new way requires changes in time allocation and energy expenditures. Farmers differ a great deal in access to these resources or to the institutions controlling them. Women and the elderly have less/no access to some of these production resources.

Most diffusion studies found that innovative farmers most times, have a higher access to resources to the detriment of other farmers. These innovative farmers are therefore, better able to adopt innovations and can afford to run the risk of innovations.

5. Access to information: Progressive farmers usually have higher access to information and to new ideas than other farmers. Such information are market price, new varieties of seeds, agronomic practices, etc. Innovative farmers know more and have more ways of evaluating an innovation, quite apart from hearing about it earlier.

When a population is less homogenous, the innovation does not mean the same for every farmer. An innovation may not be appropriate, for example, to the Laggards. This means that people who do not adopt an innovation are wrongly classified into a group they marginally or do not belong.

A weakness in some developing countries extension framework is the concept of progressive farmer strategy. This strategy assumes that the farming population is homogenous and any innovation is thought to be relevant for all the farmers. The only aspect in which the farmers differ, according to the progressive farmer strategy is their innovativeness, that is, their eagerness to adopt new ideas. Farmers differ in some mental capacity, or attitudes. Most extensionists will feel they are entirely justified in going to those who are keen, who help themselves and therefore, deserve to be helped.

The progressive farmer strategy does not consider possible differences in access to resources, which make an innovation marginally relevant or keep it out of reach of certain categories of farmers. This is a serious flaw in the progressive farmer approach, which has led to the neglect of the resource-poor farmers.

The progressive farmer strategy is only useful when groups of identified farmers are considered homogenous and the innovations were developed to suit the characteristics of the homogenous categories.

## **9. The Principles of Target Categorisation**

Enhancing the adoption of any innovation requires a systematic practical approach. The approach involves:

1. Using relevant variables to segment a heterogeneous population into categories in such a way that variance in those variables is maximized between the categories and minimized within them.
2. Analyze people within each category on aspects, which are salient to decision making about interventions (e.g. communication channels through which members of the category can be reached; the communication content which could lead to their voluntary change).
3. Design intervention programme content and strategy based on the information gathered in stage two.
4. Testing of the content and strategy with representative members of the target category.
5. Mount the intervention to cover the intended target category selectively. This is the essence of the target category approach.

## **10. Concept of Poverty**

### **Defining Poverty**

- Poverty consists of physiological and social deprivations.
- Physiological deprivation refers to an inability to achieve basic material and physiological needs.

- This can be measured either as a lack of income, which limits access to food and education, health, housing, water, sanitation services, high-quality diet rich in micronutrients, and health status.
- Diet quality is crucial to individual well-being, particularly for girls, women, and infants.
- Income and achievements correlate, imperfectly. For example, households with relatively high-income consumption levels often contain individuals who do not get enough of the right type of food to stave off hunger, anemia, goiter, or death. This can occur because of lack of information (for example, household leaders do not realise the value of girls' diets are low in iron), preferences (there may be a deliberate bias toward education for boys at the expense of girls), or an inability to use income to purchase inputs required for well-being (for example, sanitation services that cannot be purchased in the market).
- Income and consumption measures are employed to assess physiological deprivation. However, nutrition indicators based on the height and weight of young children are often used as simpler measures of physiological deprivation.
- Social deprivation is assessed at the individual or community level. It refers to an absence of elements that are empowering (e.g. autonomy, time, information, dignity, and self-esteem).
- Lack of empowerment is reflected in exclusion from important decision-making processes, even when the outcomes are of considerable importance to the poor. E.g., decisions about public investments in the local community, management of common properties, and priorities for agricultural research and extension.

- The physiological and social deprivations interact in a vicious cycle. For example, increased empowerment leading to greater income-earning ability, which leads to greater power, and so on.

### **11. How Agricultural Research can Benefit the Poor Farmers**

1. Research can help poor farmers directly through increased own-farm production by providing more food and nutrients for personal consumption and increasing the output of marketed products for greater farm income.
2. Poor farmers can gain greater agricultural employment opportunities and higher wages within the regions that adopt improved technologies.
3. The poor can have opportunities to migrate to other agricultural regions.
4. Growth in the rural and urban non-farm economy induced by more rapid agricultural growth can benefit a wide range of rural and urban poor people.
5. Research can lead to lower food prices for all consumers, whether from rural or urban areas.
6. Research can lead to greater physical and economic access to crops that are high in nutrients and crucial to the well-being of the poor especially poor women.
7. Research can empower the poor by increasing their access to decision making processes, enhancing their capacity for collective action and reducing their vulnerability to economic shocks via asset accumulation.

### **12. Strategies for Poor Farmers' Agricultural Research**

1. Increasing production of staple foods in countries where food price effects are still important and/or that have comparative advantage in growing the crops.
2. Increasing agricultural productivity in many less productive lands.
3. Helping small holder farms in all kinds of areas to diversify into higher value products, including livestock products, especially in countries with rapidly growing domestic markets for such products and/or access to suitable markets.
4. Increasing employment and income-earning opportunities for landless and near-landless workers in labor-surplus regions.
5. Developing more nutritious and safer foods to enhance the diets of poor people by investing in agricultural technology that reduces the price of micronutrient-rich foods in urban and well-integrated rural areas.
6. Undertaking agricultural research in ways that are more empowering to poor farmers.