

## UNIT-4

### TRANSFER OF TECHNOLOGY FOR LIVESTOCK DEVELOPMENT

Technology- Concept, generation process, application, merits and de-merits. Adoption and diffusion of innovations, stages of adoption, adopter categories, innovation decision process, attributes of innovations, diffusion process, factors affecting adoption and diffusion processes. Programme planning- principles, objectives and steps. Evaluation of extension programme, constraints in the adoption of scientific animal husbandry practices. Role of extension agents in diffusion of livestock innovations. Cattle and buffalo improvement programmes: Key Village Scheme, Intensive Cattle Development Project, Gosadan and Gaushala. Dairy development programmes: concept of cooperation, Rochdale principles of cooperation, objectives of cooperative, Amul pattern of dairy cooperative system and Operation Flood.

Transfer of technology projects of Indian Council of Agricultural Research (ICAR): KrishiVigyan Kendra (KVK), Agricultural Technology Information Centre (ATIC), Agricultural Technology Management Agency (ATMA), National Agricultural Innovation Project (NAIP), Rashtriya Krishi VikasYojana (RKVY) etc. Different ongoing central and state government animal husbandry development programmes being run related to sheep, goat, poultry, piggery, fodder production etc.

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**Technology:** It is a design for instrumental action that reduces the uncertainty in the cause-effect relationships involved in achieving a desired outcome. Most technologies have two components: (1) hardware, consisting of the tool that embodies the technology as a material or physical object, and (2) software, consisting of the knowledge base for the tool. The software information embodied in a technology serves to reduce one type of uncertainty that concerned with the cause-effect relationships involved in achieving a desired outcome.

#### What is Technology?

Technology refers to the practical application of scientific knowledge for a purpose. It also includes the capability and skills required to apply the knowledge.

Technology enhances the usefulness of goods and services in a safe manner. It aims at creating value. Technology can be both material and non-material (virtual). Technology includes instruments, tools, machines and other devices that benefit human life.

Technology may include simple items such as clothing, zip, housing, and complex items such as airplanes, robots, etc. Even the discovery of fire during stone age and the process of producing light, heat and cooking food are the examples of technology.

The non-material (virtual) tools and machines such as computer software, internet, etc. are also considered technology.

#### What are the advantages of Technology?

The advantages of technology are discussed below:

1. **Increased food output:** We depend on food for our living. With the introduction of methods and techniques of cultivation, human-beings are able to increase food

output. The modern irrigation technologies have helped to cultivate lands that were otherwise considered barren. The agriculture equipment such as tractor helps the farmer in his farming.

2. **Increased industrial output:** As a result of introduction of technology in the process of producing goods, there has been tremendous increase in the industrial output. The automation of industries processes has resulted in processing tasks effectively and efficiently. Large industries make good use of engineering technology for large scale production of goods.
3. **Business growth:** Technology has positively impacted business activities involving manufacturing, selling, marketing, distribution, recording, etc. Technology has touched almost every sphere of business activities. Businesses need to make wide variety of mathematical calculations for various purposes such as counting, estimation cost and profit, etc. Prior to the introduction of calculators, all these mathematical calculations were done manually. With the introduction of computers, large business data are effectively processed and stored in computers. The growth of e-Commerce business is an excellent example of how Information Technology can benefit our life.
4. **Comfort:** Technology had made human life comfortable. Everything that we see and use in our daily life is the gift of technology. The clothes we wear, the house we live, the car we travel, the bridge and flyovers, the mobile phone we carry, the fan, etc. are all examples of successful implementation of technology.
5. **Better utilization of resources:** Modern tools and equipment has helped us to utilize the natural resources at optimum level. For example, the irrigation technologies have enabled us to make better utilization of water resource in the field of agriculture. Hydro power plants, thermal power plants, nuclear power plants, etc. uses natural resources to generate power.
6. **Ease in travelling:** The invention of wheel is perhaps the most important technological discovery in human history. Automobiles, trains, etc. are powered by engine and run on wheels.
7. **Improved communication:** Printing press, internet, telephone, email, and other communication technologies have helped us to communicate on global scale.
8. **Education:** Virtual classes are a delivered at many schools. E-learning is a relatively new concept. Students make use of internet technology to download important study materials in the form of text, audio and videos.
9. **Healthcare:** Technology has revolutionized the healthcare industry. The various diagnostic tools such as x-ray machines, blood pressure monitoring machine, glucose level measuring machine, etc. has made possible accurate diagnosis of health related problems. Accurate diagnosis of disease results in faster and effective treatment of the patient.
10. **Emerging technologies:** Emerging technologies such as Information Technology, bio-technology, artificial intelligence, etc. are among the most important technologies of modern times. The introduction of computers, internet,

smartphones, etc. have deep impact on common people. Much research is being conducted in the field of artificial intelligence.

11. **Food Preservation:** The food preservation technologies help in freeing the world from food crisis. Food preservation technologies such as freezing, canning, packaging, drying, etc., prevent or slows down the growth of bacteria and yeast. This helps in preservation of the foods items that can be consumed in the future.
12. **Architectural excellence:** Architectural, building and modern engineering are applied in designing urban skyscrapers, flyovers, and bridges. Newer technologies constantly strive to make use of reliable, environment friendly building materials. They also put emphasis on space, light and safety.

### **What are the disadvantages of Technology?**

The disadvantages of Technology are discussed below:

1. **Pollution:** Too much use of technology has resulted in an increase in waste products into the environment. This has caused pollution. The discharge of industrial wastes into the environment diminishes the quality of soil, water, air, etc. The vehicle emission is among major causes of air pollution. Excessive use of pesticides in farming has caused soil erosion.
2. **Faster depletion of natural resource reserves:** Modern equipments are very powerful. They can quickly extract huge quantity of natural resources. However, the total reserves of natural resources are depleting as a result of quicker extraction of natural resources.
3. **Production of unwanted products:** Technology has also opened doors for the production and demand of unwanted products or unnecessary products.
4. **Wastage of time in non-productive activities:** Some people waste immense time and energy in doing non-productive activities. For example, internet technology has enabled people to browse the internet for information. However, some people get addicted to internet activities such as browsing, gaming, etc., and waste time and energy.
5. **Excessive dependency:** We are dependent on technology for all of our task. People are excessively dependent of modern gifts of technologies such as cars, computers, smartphones, etc. They feel helpless if any of these technological equipment, machinery or tool fail to perform. We have adopted technology in our life to an extent that it is impossible to think of performing our day-to-day tasks without the help of technology.
6. **Effect on health:** Though various technologies have made our life comfortable, they have come at the cost our health. The impure air and water is hazardous to human health. Loud noise of vehicles and running factories disrupts the human auditory senses. Excessive use of smartphones causes stress and posture related health issues.
7. **Social gap:** Not all people know to make the best use of technology. Some people use modern technologies to work in their favour, while there are others who find themselves in miserable condition. This may causes a gap in the society. Further, a

situation of digital divide is created when too many people who do not have access to digital technologies such as internet and computers.

- **Adoption:** It is decision to make full use of an innovation as the best course of action available. When an individual takes up a new idea and practices it, the phenomenon is known as adoption.
- **Adoption Process:** It is a mental process through which an individual passes from first hearing about a new idea to its final adoption.
- **Diffusion of Innovations** is defined as "the process by which an innovation is communicated through certain channels over time among the members of a social system" (Rogers). Diffusion of Innovations is a theory of how, why, and at what rate new ideas and technology spread through cultures.
- **Diffusion:** It is the process by which an innovation is communicated through certain channels over time among the members of a social system. Diffusion is a special type of communication concerned with the spread of messages that are perceived as new ideas.

**Diffusion process:** It refers to the spread of new ideas from originating sources to ultimate users. In the case of agriculture, it is the process in which new farm practices communicates or ideas from sources of origin, usually scientists to farmers

#### **Elements of Diffusion:**

**Innovation:** This is new and latest developed technology for the welfare of mass, innovation is a new-way to doing some things, in regards to agriculture extension education. Innovation is that idea which is accepted as a new idea by the farmers. In other words it can be said it is an idea, practice, or object that is perceived as new by an individual or other unit of adoption.

#### **The characteristics of the new idea / innovation.**

1. **Relative advantage:** It is the degree to which an innovation is perceived as being better than the idea to which it replaced. No cost and low cost practices / technology are generally adopted more rapidly and easily than high cost technology. Practices / technology producing quick returns are more rapidly adopted. Potential adopters need to see an advantage for adopting the innovation.
2. **Compatibility:** It is the degree to which an innovation is perceived as consistent/reliable with the existing social values, past experiences and needs of the social system. Compatibility of innovation is essential for its adoption. When new practice/idea is consistent / in agreement with their social and cultural values and beliefs will be accepted more rapidly. Compatibility has at least two dimensions: First is **Situational compatibility;** when a new crop variety suits to the agro-climatic condition of the farmers. It indicates situational compatibility. Whereas another is **Cultural compatibility;** when a new breed of livestock advocated to the farmers is in agreement with their beliefs and values. It is cultural compatibility.
3. **Complexity:** It is the degree to which an innovation is perceived as relatively difficult to understand and use. New idea /practices that are relatively simple to understand and use will be accepted more quickly than the more complex idea /practices. So that innovation should, as far as possible, be less complex for the farmers to understand and use. Complex technologies, because of their complicated and intricate nature, require regular training and communication support to its users/ clientele, for their adoption and continuous use.

4. **Trialability / Divisibility:** It is the degree to which an innovation may be experimented on a limited basis. A practice /technology that can be tried on a limited basis will be generally adopted more rapidly. Adoption of new seeds and fertilizers are more, compared to farm machinery, simply because seeds and fertilizers may be purchased in small units and tried. The potential adopters want the availability of "testing" before adopting.
  5. **Observability:** potential adopters want to see observable results of an innovation. Observability or Visibility is the degree to which the results of an innovation are visible. The more visible the new practice and its results, the more rapid its adoption is. The visible impact of an innovation facilitates its communication and diffusion in the social system. For example the effect of nitrogenous fertilizers on plant growth and crop yield is very obvious in the eyes of the farmers. Understanding the beneficial effect of fertilizers its rates of adoption is generally high.
- B Innovation-decision process:** It is the mental process through which an individual (or other decision-making unit) passes from first knowledge of an innovation to forming an attitude toward the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision. There are five steps in this process: (1) knowledge, (2) persuasion, (3) decision, (4) implementation, and (5) confirmation. The decision stage leads towards adoption or rejection of innovations.

Rogers' Innovation Decision Process theory states that diffusion is a process that occurs over time and can be seen as having five distinct stages. The stages in the process are knowledge, persuasion, decision, implementation and confirmation. According to Rogers' research, potential adopters of an innovation must learn about the innovation (knowledge), be persuaded as to the merits of the innovation (persuasion), decided to adopt (decision), put the innovation in place (implementation), and reform the decision to adopt the innovation (confirmation).

1. **Knowledge:** The possession of understood information or say knowledge is very essential step in the process of innovation decision process. It occurs when a person or other decision making individual is exposed to the innovation's subsistence and gains some perceptive of how it functions. Knowledge function is mainly cognitive or knowing. Knowledge searching is instigated by an individual and is greatly influenced by one's tendency. Exposure is selective and generally an individual tends to expose to those ideas, which are consistent with one's existing attitudes and beliefs, and avoids those, which are in conflict with them. A need can motivate an individual to seek information about an innovation and the knowledge of an innovation may develop the need.
2. **Persuasion:** It takes place when a person or other decision-making individual forms favorable or unfavorable feelings toward the advances. Persuasion is mainly connected to feeling. At this phase the person turns out to be more sensitively involved with the innovation and vigorously tries to find information about innovations. During the process of developing a favourable or unfavourable attitude towards the innovation, the person may psychologically apply the new idea to the current or probable future situations before making a decision whether or not to try it.

3. **Decision:** It occurs when a person connects in activities, which guide to a selection to adopter disallows the innovation. The person puts the innovation to a small-scale trial in own location. Taking into consideration the relative advantage, risks involved and many other connected factors like accessibility of market, need for the family etc the person takes a decision to adopt or reject the advances.
4. **Implementation:** It occurs when a person puts aninnovation into real use. At this phase, he is normally worried with where to get the innovation, how to exercise it and what operational problems will be faced and how these could be solved. Implementation may involve changes in management of the enterprise and/or modification in the innovation, to suit more closely to the specific needs of the particular person who adopts it.
5. **Confirmation:** It takes place when a person seeks back up of an innovation-decision already made, but it may reverse this previous decision if exposed to conflicting messages about the innovation. The decision to adopt or reject a new idea is not a terminal act. Person's mind is in a dynamic shape so he continually evaluates the situation. If the person recognizes that the new idea is constantly giving acceptable or unacceptable results, the person may continue to adopt or reject the innovation as the case may be.

### **Stages of Adoption Process:**

Social scientists have suggested that whole process of adoption does not occur at a time. It is gradual process, which can be explained into five stages. Although, more or fewer stages may exist, at the present time there seem to be five main functions. The five stages are:

1. Awareness            2. Interest        3. Evaluation            4. Trial and    5. Adoption.
1. **Awareness:** In the awareness stage the individual is exposed to the innovation but lacks complete information about it. This process occurs by the chance or by the purposeful efforts made by communicator or person himself. The degree of getting more awareness about new innovation depends upon activeness of an individual, his need to solve the new problem, his attitude to make progress in his existing farming and economic conditions. In addition to this overall activeness in terms of individual's exposure with mass media, extension workers, literature and other members of social system are also role players in the process of creating awareness.
2. **Interest:** At the interest or information stage the individual becomes interested in the new idea and seeks additional information about it. This is affected by characteristics of new innovations, if innovations are as per the need of the individual, fitting with potential adopters' current practices and values, easy to use, testable and observable, there are more chances to create interest among the individuals. Thus, at this juncture, an individual is starting to take interest in the new idea or practice and tries to acquire more information about it. He wants to know what new idea / technology is, how it works and what are its potentialities.
3. **Evaluation:** At the evaluation stage the individual mentally applies the innovation to his present situation and anticipated future situation and then decides whether or not to try it. Thus, here person tries to become mentally stronger to adopt the innovation. The person through many mental dialogues with in himself tries to convince his mind and body. He also makes an assessment whether the new idea is applicable to his own situation, and if applied what would be the result. Thus, at this

stage, an individual after accessing every possibilities of new innovation accepts it principally.

4. **Trial:** The individual actually applies the new idea/practice on a small scale to determine its utility / performance in his own situation. During the evaluation stage, if he found that new innovation has some plus points for him or it is advantageous to him, he takes a decision to try it on small scale to test its effectiveness. Trial may be well thought-out as the practical appraisal of an innovation and therefore the individual makes full use of the innovation on small scale.
5. **Adoption:** At the adoption stage the individual decides to continue the full use of the innovation. Trial may be considered as the practical evaluation of an innovation. It provides evidence of the advantages of the innovation. Being satisfied with the trial and considering the pro and cons of the situation, the individual takes a final decision to make the full use of the innovation in terms of time and extent.
  - **Rejection:** It is a decision not to adopt an innovation. Rejection may take two forms.
  - **Active rejection:** This means decision of an individual not to adopt an innovation even after considering it for adoption may be after talking trial of it.
  - **Passive rejection:** It is also called as non-adoption; in this case individual takes direct decision not to adopt an innovation means he never really considers the innovation to adopt.

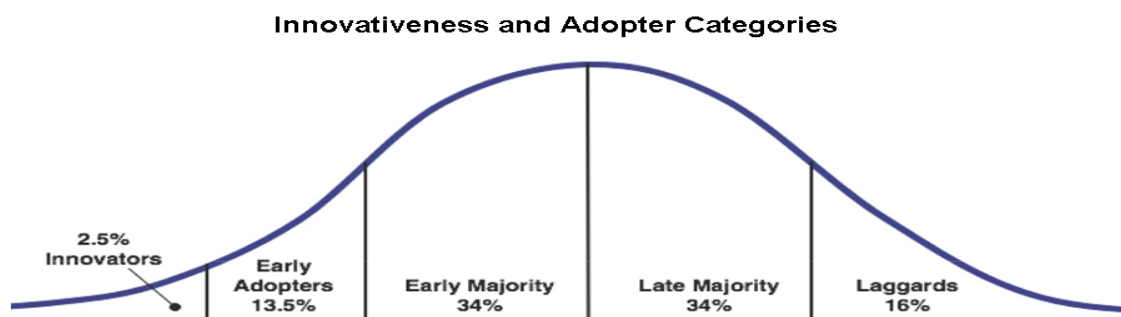
**Discontinuance:** it is a decision to reject an innovation after having previously adopted it. Discontinuance may also take two forms.

- **Replacement Discontinuance** is a decision to reject an idea in order to adopt a better idea that supersedes it.
- **Disenchantment Discontinuance** is a decision to reject an idea as a result of dissatisfaction with its performance; Crop varieties generally deteriorate after a number of years. They are then replaced by superior varieties, if available, or may not be cultivated at all.

**Over adoption:** Sometimes it may happen that people continue to adopt an innovation, rather vigorously, though experts feel that it should not be so done.

### CATEGORIES OF ADOPTERS:

All individuals in a social system do not adopt an innovation at the same time. Research indicates that the diffusion of new idea /practice usually requires several years. In the first year, a few farmers adopt it; then in a short span of time, a large numbers try it; and finally the remaining members of society accept it. On the basis of time required for adoption of new practices, farmers are classified in to different adopter categories:



## **I. Innovators:**

The first to adopt a new practice in social system are known as innovators. They are generally very few (2.5 percent) in number. The innovators may sometimes act as technology modifiers. They have larger than average farms, are well educated and usually come from well-established families. They usually have a relatively high net worth probably more important, a large amount of risk capital. They can afford and do take calculated risks on new products. They are respected for being successful, but ordinarily do not enjoy the highest prestige in the community. Because innovators adopt new ideas so much sooner than the average farmer, they are sometimes ridiculed by their conservative neighbors. This neighborhood group pressure is largely ignored by the innovators, however. The innovations are watched by their neighbours, but they are not followed immediately in new practices.

The activities of innovators often transcend local community boundaries. Rural innovators frequently belong to formal organizations at the county, regional, state, or national level. In addition, they are likely to have many informal contacts outside the community: they may visit with others many miles away who are also trying a new technique or product, or who are technical experts.

Thus, in short the innovators are venturesome, generally highly educated and have high social status and more prestige in the community. They have more risk bearing capacity and more favourable attitudes towards scientific values. The innovators are oriented to develop good contacts with the research and high level of extension functionaries. They have good contacts with cosmopolite sources of information.

## **II Early adopters:**

Early adopters are localities and are more integrated part of the community. They do not test untried ideas, but quickest to use tried ideas in their own situation they have more opinion leadership. They are good source of advice and information for neighbours in the community. They are generally 13.5 per cent in a social system.

Early adopters have slightly higher education, are a little younger in age, have large size enterprise and high income, more participation in formal organizations. Their social status is high and they have many informal contacts within the community. They have more contacts with extension workers.

**III Early Majority:** These farmers adopt new idea/innovation a little earlier than the average farmers of the community. They are slightly above average in age, education, and farming experience. They have medium high social and economic status. They are less active in formal groups than innovators or early adopters, but more active than those who adopt later. In many cases, they are not formal leaders in the community organizations, but they are active members in these organizations. They also attend extension meetings and farm demonstrations. They are generally 34.00 per cent in a social system.

The people in this category are most likely to be informal rather than elected leaders. They have a following insofar as people respect their opinions, their "high morality and sound judgment." They are "just like their following, only more so." They



must be sure an idea will work before they adopt it. If the informal leader fails two or three times, his following looks elsewhere for information and guidance. Because the informal leader has more limited resources than the early adopters and innovators, he cannot afford to make poor decisions: the social and economic costs are too high.

These people tend to associate mainly in their own community. When people in the community are asked to name neighbours and farmers with whom they talk over ideas, these early majorities are named frequently. On their parts, they value highly the opinions their neighbors and friends hold about them, for this is their main source of status and prestige. The early majority may look to the early adopters for their new farm information.

**IV Late majority:**

These farmers are cautious/watchful and skeptical /doubtful and adopt new ideas just after the average members of the community. They adopt mainly because people have already adopted the innovation and getting the benefit out of it. They are generally 34.00 per cent in a social system. They have low level of education, low level of participation in social organizations and depend mostly on localite sources of information.

**V Laggards.**

Laggards are the last to adopt new ideas in their social system. They resist / refuse accepting new ideas/innovations until everyone else in the community has adopted them. Farmers in this category are generally, oldest in age; they have least or no education, very few social contacts and low participation in formal organizations. They believe in agricultural magic and have traditional attitudes. They are fatalistic in nature. They regard extension workers with negative attitudes and suspicion. They are generally 16.00 per cent in a social system.

**Factors associated with adoption process:**

Following are the different factors which effect/influence the diffusion and adoption of new innovation/practice

<i>Personal Factors</i>	<b>Social Factors</b>	<b>Cultural Factors</b>	<b>Situational Factors</b>
<b>1) Age</b> 2) Education 3) Knowledge 4) Psychology a. Rationality b. Mental flexibility c. Innovation - proneness	a. Social values b. Local leadership c. Social contacts a. Nature of social contacts b. Extent of social contacts 4. Social distances	1. Culture 2. Values 3. Attitudes	1. Farm income 2. Farm size. 3. Tenure status 4. Information sources 5. Standard of living 6. Supply and service 7. Government policy

## PROGRAMME PLANNING

1. **Extension programme** is a statement of situations, objectives, problems and solutions. It is relatively permanent but requires constant revision.
2. **Programme planning** is a decision making process involving critical analysis of the existing situation and the problems, evaluation of the various alternatives to solve these problems and the selection of the relevant ones, giving necessary priorities based upon local needs and resources by the cooperative efforts of the people both official and non-official with a view to facilitate the individual, community growth and development.
3. **Project** is a specification of work to be done or procedure to be followed in order to accomplish a particular objective. Project is an outline of procedure and pertains only to some phase of extension work.
4. **Plan** is a predetermined course of action.
5. **Plan of work** is an outline of activities so arranged as to enable efficient execution of the programme. It is a statement of activities to be undertaken by an individual, a group of people or an organization, within a definitely stated time, to carry out the recommendations in the programme. The plan of work indicates
  - a. what is to be done?
  - b. who is to do it?
  - c. how it is to be done?
  - d. when it is to be done?
  - e. who are to be served or reached? and
  - f. how the results will be measured?.
6. **Calendar of work** is a plan of activities to be undertaken in a particular time sequence. Calendar of work is a plan of work arranged chronologically.
7. **Situation** is a brief statement of the more general factual information together with the needs and desires of the people.
8. **Aims** are generalized and broad statements of directions with respect to given activities. Eg: Extension Worker's aim is to improve farmers' economic condition. Objectives are expressions of ends towards which our efforts are directed Eg: To increase paddy yield by 40%
9. **Goal** is the distance in any given direction one expects to go during a given period of time. Eg: To increase Paddy yield by 20 Q/ha. in the current year.
10. **Problem**- It is a condition that the people after study, with or without help have decided needs changing
11. **Solution**- It is a course of proposed action to change an unsatisfactory condition to one that is more satisfying
12. **Programme development process** is defined as a continuous and cooperative activity involving lay people and the extension staff in which problems are identified, objective are set forth and action is taken to reach the objectives. Entire programmes should be based upon needs of people.

## OBJECTIVES OF HAVING A PROGRAMME

1. To ensure careful consideration of what is to be done and why.
2. To furnish a guide (criteria) against which to judge all new proposals.
3. To establish objectives towards which progress can be measured and evaluated.
4. To have a means of choosing the important (deep rooted) from incidental (minor, less important) problems and the permanent from the temporary changes.

5. To develop a common understanding about the means and ends between various functionaries and organization.
6. To ensure continuity during changes in personnel.
7. To help develop leadership.
8. To avoid waste of time and money and promote efficiency.
9. To justify expenditure and to ensure flow of funds.
10. To have a written form of statement for public use.

### **PRINCIPLES OF EXTENSION PROGRAMME PLANNING**

1. Extension Programmes should be based on an analysis of the past experiences, present situation and future needs. For programme determination adequate information about the people and their situation have to be collected. The present situation is to be analyzed and interpreted on the basis of past experiences, by taking local people into confidence. This shall help in arriving at the future needs.
2. Extension programmes should have clear and significant objectives, which could satisfy important needs of the people. **The ultimate objective of programme building is to satisfy the needs of the people.** For this purpose, significant objectives pertaining to important needs of the people should be selected and clearly stated. The emphasis shall be on what is attainable rather than on what is ideal, although one should not lose sight of the later.
3. Extension programmes should fix up priority on the basis of available resources and time. The rural people, particularly in the developing countries, have a multitude of problems. All problems cannot be taken up at a time for solution, because of the limitations of trained personnel, availability of funds, facilities and other resources. Time is also a limiting factor as both the people and the funding agencies cannot wait for an indefinite period of time to get the results. Considering all these parameters, it is essential to fix up priorities in the programme.
4. Extension programmes should clearly indicate the availability and utilization of resources. All extension programmes should clearly state where from the funds, facilities, supplies and the needed personnel shall be made available and how these shall be utilized. This shall make the programme practical and workable.
5. Extension programme should have a general agreement at various levels. Programmes prepared at various levels such as village, district, state and national levels should conform to each other and shall not work at cross purposes. Similarly, extension programmes of a particular department should not be in conflict or contradiction with the extension programme of another department.
6. Extension programme should involve people at the local level. Extension programmes are implemented at the local level. Local people should, therefore, be involved all through, from programme formation to programme implementation.
7. Extension programmes should involve relevant institutions and organizations. Extension programmes cannot be implemented in isolation. It requires the support of many institutions and organizations. The programme should broadly indicate the institutions and organizations to be involved and how they shall contribute in attaining the programme objectives.
8. Extension programme should have definite plan of work. The plan of work may be separately drawn up or incorporated in the programme. The programme should broadly indicate how it will be executed. Unless the plan of work is drawn up, the programme remains a theoretical exercise.
9. Extension programmes should provide for evaluation of results and reconsideration of the programme. Extension programme is not a static outline of activities. The

programme should make provision for periodical monitoring and evaluation of results to judge its progress. On the basis of the findings of evaluation, the programme should be suitably modified to facilitate its reaching the objective within the stipulated period of time.

10. Extension programmes should provide equitable distribution of benefits amongst the members of the community. It has been found that, in a community generally the resource rich persons benefit more in comparison to the resource poor, from the implementation of extension programmes. The gap between rich and poor is getting widened. As this may generate social disparity and social tensions, the planning of extension programmes should give adequate emphasis on the weaker sections

### STEPS IN EXTENSION PROGRAMME PLANNING

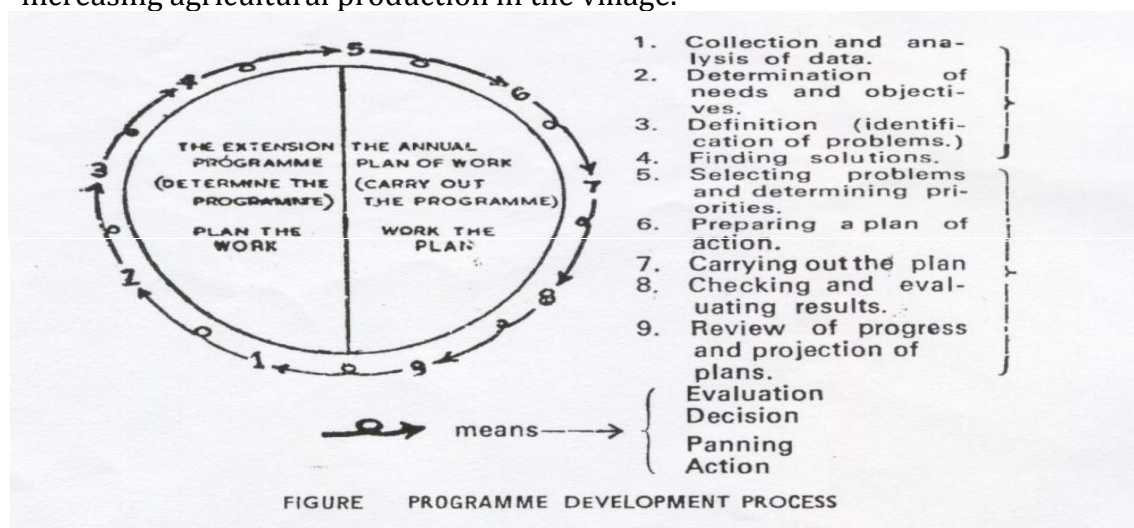
The preparation, execution and evaluation of the extension programme involves the following steps

1. Collection and analysis of data
2. Determination of objectives
3. Definition of problems
4. Finding solutions to problems
5. Selecting problems and determining priorities
6. Preparing a plan of action or Annual plan of work
7. Carrying out the plan
8. Continuous checking and evaluation of results
9. Review of progress and projection of plans

**1. Collection and analysis of data:** Good planning depends on the collection of adequate, reliable data about the situation. The facts must be carefully analyzed and interpreted through the joined efforts of technically trained staff and progressive village leaders. All extension workers must possess the basic farm and family information for preparing sound family, village and block plans which should include

(a). Basic information about the village includes the data pertaining to population, total number of families, main occupations of the village, communication facilities, schooling facilities, medical facilities, drinking water facilities etc.

(b). Information about farm management and production programmes includes total cultivated area of the village, size of agricultural holdings, types of crops, soil... types, disease and pest control, agricultural machinery etc. It is necessary for increasing agricultural production in the village.



**2. Determination of objectives:** Effective rural development programmes must have clear and significant objectives before deciding the project to be undertaken. The basic objectives of the programme are to be determined by the villagers in consultation with extension personnel. The villagers should have the clear concept of the project by deciding on objectives. The involvement of various institutions and voluntary organizations should be secured. The objectives of the programme for family plans could be decided upon by the head or active members of the participating family and by Panchayats in case of objective to be undertaken on community or village basis. The objectives should specify behavioral changes of the people.

**3. Definition of problems:** The village activities should be classified properly before planning. This helps in execution of the programme. Problems can be classified into 3 categories as follows

- a. Problems solved by the villagers with their own resources like improving the yields by adopting improved practices, digging compost pits, organizing rural youth clubs etc.
- b. Problems that need community cooperation without involving much outside assistance like construction of village approach road or deepening of tank etc. by volunteering efforts.
- c. Problems that require outside assistance on account of high cost involved and the technical knowledge needed like purchase of plant protection equipment, construction of school building etc.

In this way the internal and external resources can be utilized economically and quicker results obtained. It is also desirable to break up complex problems step by step in to simple problems

**4. Finding solutions to problems:** The extension workers should advise the villagers and guide them in finding the solutions to the problems. The solutions offered should be practicable, economical and should result in satisfaction and learning. District and state specialists should help the extension functionaries at the village and block level in doing this work.

**5. Selecting problems and determining priorities:** All the problems cannot be tackled simultaneously even though solutions are known for them. At this stage it is essential to set up programme committees at village and block levels to review the situation periodically for determining how much progress has been made on projects under way, which projects are completed and which new projects need to be started. Extension workers have to play a great role in this respect.

**6. Preparing a plan of action or Annual plan of work:** A plan of work is listing of activities by which objectives already decided upon are to be achieved. It includes the methods of executing a programme, timing and persons responsible for carrying out programme along with evaluating the progress. It is an important step to solve selected problems. It is essential to involve villagers in planning the programmes.

**7. Carrying out the plan:** The success of the programme depends on the method by which it is carried out. For successful implementation of any programme, it is desirable that advance planning is made at the first step towards its implementation. The activities to be carried out each month should be taken out. Proper arrangement for the supply of materials and training of workers should be made. All steps in carrying out the programme should be discussed with the villagers and local leaders and the consent should be obtained to see full cooperation, steps for assistances and direction should be clearly stated to avoid confusion in launching the programme

**8. Continuous checking and evaluation of results:** Adequate records of each activity should be kept for future evaluation by extension staff, development committees and village institutions. Each future programme should be based on results of the previous one. Successful evaluation gives a correct direction to the programme. The evaluation of programme has to be done with the reference to the original objectives set. Systematic evaluation provide information about the effectiveness of various methods used and various steps taken for executing the programme

**9. Review of progress and projection of plans:** At the end of each cycle of programme planning process as a periodical review of situation and reconsideration of plan for setting up revised objectives should be done in view of the changes in social and economic levels of people. Acceptable programmes may be expanded to the neighboring areas. Research should be conducted to find out the reasons of failure of the programmes. All developmental programmes are tools for doing more work that is effective.

## **EVALUATION OF EXTENSION PROGRAMMES AND THEIR IMPACT ANALYSIS MEANING AND SCOPE**

- “Evaluation” in its broadest sense means judging the value of something. It may be informal or formal.
- Formal evaluation may be defined as a process of systematic appraisal by which we determine the worth, value or meaning of something.
- This something in extension may be a programme or part of programme, a method used in carrying on extension work, or a situation such as a community, a Block or even a larger area.
- The purpose of evaluation is to facilitate effective decision making without jumping to conclusions.

Extension evaluation is the process of determining how well the desired behavioral changes have taken place or are taking place as a result of extension educational effort.

## **IMPORTANT ELEMENTS OF EVALUATION PROCESS**

The three important elements in the evaluation process are

1. Observations or collecting some information.
2. Applying some standards or criteria to our observation.
- 3 Finally, forming some judgment, drawing some conclusions or making some decisions

## **STEPS INVOLVED IN AN EVALUATION PLAN**

1. Need for the evaluation
  - What extension project, problem, activity, job, method or situation do you want to evaluate?
  - Why evaluate it?
  - How can the results of the evaluation be used in your extension work?
2. Purpose of the evaluation
  - Is the evaluation, i. an analysis of the situation, or ii. An evaluation of teaching objectives?
  - What questions should be answered by the evaluation
3. Questions to be answered by the evaluation
  - If analysis of a situation, clarify the kinds of information needed to answer the question

- If an evaluation of teaching, clarify the teaching objectives
- 4 Analyze the teaching plan
  - Review what has been taught
  - How it was taught, and to whom
  - Changes in behavior expected as a result of the teaching
- 5 Sources of the information
  - People – farmers, farm women, local leaders, club members, non-members, extension workers etc.
  - Recorded information – reports, census etc.
- 6 Collecting the information
  - How? Interviews, mailed questionnaires, observations, etc.
  - By whom? Person making the evaluation, extension personnel, local leaders etc.
- 7 Selecting or constructing a record form
  - Kind of form: questionnaires, interview forms, tests, observation sheets, rating scales, check lists, score cards etc.
  - Data about:
    - The situation to be studied
    - Evidence or progress towards the teaching objectives
- 8 Analysis and tabulation of the data for use
  - Classification and sorting of data to answer questions in step 2b
  - Work tables needed
  - Coding of free answer questions
  - Method of tabulation
  - Sorts and sub sorts to bring out relationships
- 9 Interpreting, reporting and applying the findings
  - Preparation of tables, charts and graphs
  - Summary of findings
  - Applications to extension work

### **SIX KEYS TO EVALUATING EXTENSION WORK**

- 1 Statement of objectives  
State the objectives of an activity to be evaluated in terms of behaviour changes in the people who are to do the learning.  
e.g. Dairy farmers to learn full hand milking of cow
- 2 Source of evidence  
Only those people whom you try to reach can provide proof of success or failure.  
e.g. Those dairy farmers who attended the full hand milking demonstration
- 3 Representative sample  
Those persons who actually provide the evidence of success must be representative of all whom you tried to approach.  
e.g. Every 'n' th name from the list of dairy farmers who attended the full hand milking demonstration meeting.
- 4 Appropriate methods  
The methods of obtaining evidence must be appropriate to the kinds of information being collected.  
e.g. Recorded observation of the dairy farmers on how he milk his cow before and after the full hand milking demonstration.
- 5 Reliable questions  
Word questions carefully so as to obtain reliable, unbiased data

e.g. When asking questions about a field visit during a dairy training programme; Did you see any new methods of feeding dairy animals?

## 6 Plan to use results

Decide how you will analyse and use your evaluation results before evaluation is done.

1. Is the percentage of adoption of a practice high, low, expected or unexpected?
2. What the extension programme have done or not done to make it high, or keep it so low?
3. What other factors are related to it?
4. How should the extension methods or programmes be changed to bring about a different kind or different amount of change?

### **Personal factors:**

**1. Age:** Older farmers seems to be adopt somewhat less inclined to adopt new farm practices than younger ones, because of their traditionalism. Highest adoption of new practices/ideas or Innovation is generally found in middle-aged farmers, because of their high education, more social participation and contacts with extension agencies and farming experience.

**2. Education:** Educational level of the farmers plays an important role in adoption of new ideas / farm technology. Farmers with high educational level adopt improved farm and home practices than illiterate farmers, because of their progressive nature and positive attitude toward new technology.

**3. Psychological characteristics:** It includes rationality, mental flexibility, and orientation toward farming and innovation proneness. Exposure to reliable sources of farm information may create a state of rationality, which in turn predisposes an individual to the adoption of new farm technology. A mentally flexible person has higher rates of adoption of farm innovations than one with mental rigidity. The positivism with other psychological capabilities like expected level of risk bearing capacity, scientific orientation, achievement motivation, marketing orientation, positive feelings towards modern innovations, economic motivation, empathy and cosmopolitaness lead farmers towards high level of adoption of innovations.

### **Social factors:**

**1. Social values:** In some group and communities, people place a higher value upon materials gains and money than they do others. A group or community where there is great emphasis on maintaining traditions and values rooted in the past, change/adoption of new technology occurs slowly. On other hand, where emphasis is upon individualism and personal success, change occurs rapidly.

**2. Local leadership:** The acceptance of change is also influenced by the nature of leadership and control in the group or community. In some communities, none would accept new idea, unless and until their leaders recognize it. Once new idea recognized by local leadership of the community/group, all farmers in the community accept it. In such situation it is important to identify and use such influential leaders.



**3. Social contacts:** The nature and extent of social contacts within, and outside the community is important in the diffusion of new ideas and techniques. The presence of social organizations in the community will aid directly or indirectly in the diffusion of innovation. Individuals of the society, those having broader contacts with outside the community, the acceptance of innovations is higher than those having primarily social contacts through kinship and other informal activities.

**4. Social distances:** The social distances associated with wide status differences in the groups /communities and it is influential factor in diffusion and adoption of farm information through interpersonal channels. For example, tenant farmers in some areas may not get ideas/information from large farm owners because of their lack of contacts.

#### **Cultural factors:**

**1. Culture:** Culture is the total man -made parts of the man's environment. The influence of cultural factors in farming stands out in clearest perspective when the behaviours of the people with different cultural backgrounds are compared. The more isolated people in terms of social contacts with outside world, there are more chance of resistant to change or adoption of new technology.

**2. Values and attitudes:** Values and attitude may be regarded as importance rating with people attach to things, conditions circumstances, their thinking, actions and feelings. They become important organizing themes the behavior of individuals. Attitude may be thought of as predispositions to act, perceive, think and feel in relation to some thing. Adoption of new technology will be higher to those farmers having positive attitude toward it. Farmers adopted new technology quickly when it is relevant to their social values; if not so it will be rejected.

#### **Situational factors:**

**1. Farm size:** Land holding possessed by the farmers is important source of their income. Farmers with large size farms adopt more advance farm technology than small and marginal farmers because of their higher income and risk bearing capacity. Farm size is nearly always positively associated with adoption of farm innovation.

**2. Farm income:** Farmers having more farm income will adopt more farm practices and high cost technology than the farmers of low-income group, because of their better investment capacity and risk bearing capacity. Higher farm income is always positively associated with adoption of new farm technology.

**3. Tenure status:** The adoption rate of new farm technology is also affected by status of holding or possession of land by the person who really wants to adopt technology. In case of adopter himself is owner of the land, there are more chances to take final decision to adopt the technology, it is reversed in case of hired/rental land. In India and many other developing countries the customary tenure system constrains technology adoption and agricultural development because the farmers make investment in adopting technology based on his status of ownership of land. The technologies, which give long-term results, are preferred to adopt by those farmers, who are owner of the

land. However technologies which require minimum investments but efficient in giving instant results are preferred by the farmers who are dependent on others land. But in this case also he is dependent on the permission of the landowners.

**4. Community prestige:** This is also an important factor in the process of adoption. It is observed that many farmers are respected for being innovators, successful and enjoying the highest prestige in the community. Such kinds of community prestigious farmers have a tendency to prove themselves in community. Thus they try to adopt new ideas sooner than the average farmer.

**5. Sources of Farm information used:** The credibility of the sources plays important role to motivate farmers to adopt new technology. The new innovations are accepted sooner and successfully if they are received by trustworthy, dependable, reliable, honorable and responsible sources.

**6. Standard of living:** Farmers with larger than average farms, high level of education, well established families, large amount of risk capital, relatively high income and probably more feeling to live high standard of living are likely to adopt new innovations sooner than farmers with low standard of living.

**7. Supply and service:** Effective and timely supply of innovations in terms of inputs like information, seed, fertilizers, implements, chemicals encourages farmers to adopt them.

**8. Government Policy:** Farmers friendly government policy in terms of electricity, supply of water for canal irrigation, marketing, loans, subsidies, input supply facilities make farmers more active in adopting new technologies.

#### **CONSTRAINTS IN ADOPTION OF IMPROVED ANIMAL HUSBANDRY PRACTICES**

1. High cost of concentrate feed/ feed ingredients
2. High cost of dry fodder
3. High cost of green fodder
4. Poor quality of concentrate feed
5. Low availability of green fodder
6. Low availability of dry fodder
7. Distant location of veterinary dispensary for treatment/ A.I. etc.,
8. High cost of veterinary aid and service
9. Lack of institutional credit facility
10. Complexity in the procedure for obtaining loans
11. Non-availability of family labour
12. Poor conception rate through A. I.
13. High incidence of repeat breeding in crossbred cows
14. Inadequate market infrastructure for livestock and livestock products
15. Non-remunerative price offered for livestock products
16. Lack of knowledge about scientific animal husbandry practices.
17. Lack of education and training facility on scientific animal husbandry practices

#### **Role of extension agents in diffusion of livestock innovations.**

##### **(Role of Key communicators):**

1. Communication of new technology to other villagers.

2. Keeping in touch with the scientists, other institutions, media and sources of information.
3. Coordinating the function of the village organization and the institutions and channelizing them towards the adoption of technologies for greater production.
4. Assisting the villagers in securing the supplies and services required by them.
5. Guiding and helping people in getting assistance from government.
6. Helping the fellow villagers in the preparation of the action plans.
7. Giving the consultant guidance and acting as local consultants.
8. Focusing on the problems of villagers and helping the extension workers and
9. Serving as the demonstrator in the case of agricultural innovation.

### **Cattle and buffalo improvement programmes:**

### **ANIMAL HUSBANDRY DEVELOPMENT PROGRAMMES - I**

#### **INTRODUCTION**

- More than 70 million households own livestock in India and most of them are poor. Majority of these households own bovines. About five million families own small ruminants. Livestock rearing especially dairy farming is recognized as an instrument of socio-economic change mainly for the landless, marginal and small farmers who depend upon agriculture for their livelihood. Livestock rearing is an important secondary occupation, which supplements their income. In rural areas especially the landless depend primarily on cattle rearing because the scope for other employment opportunities is limited. It helps them to utilize extra labour especially when opportunity cost on family labour is almost zero. Their system of livestock rearing is characterized by rearing of few low productive animals, maintained in the shade of trees or on the side of their dwellings. Whatever little production they get from their animals is almost at zero cost as the animals are maintained on low cash inputs, which include straws and grasses. Grazing of animals is the common practice followed by this segment of livestock owners. Their main advantage is that they can utilize surplus labour for rearing of livestock. Of late due to rapid urbanization and industrialization the grazing lands are getting decreased and the dependency of the landless livestock owners on purchased inputs is increasing.

#### **1 GAUSHALAS**

- Recognizing the potential of Gaushalas (about 10000) which were engaged in rehabilitation of disowned cattle, the government of India in 1952 set up the Central Council of Govsambardana (CCG). Some of these gaushalas are providing quality indigenous / cross breeds / heifers / bulls at many places like Nasik, Urli, Kanchan, Amirsar, Indore and Ahmednagar. One gaushala at Bombay has completed a century of devoted work in 1986 and has established two institutes One for research and Another for fodder research and grassland development.
- The Sabarmathi Ashram gaushala founded in 1915 by Mahatma Gandhi near Ahmedabad is now being managed by NDDDB and has a training centre for AI service including embryo transfer.

#### **Objectives**

1. To preserve the Indian cows and progeny and to breed and upgrade them for supplying plenty of unadulterated milk and milk products to the people and distribute the best female calves to the villagers.
2. Prepare best pedigree Indian Bulls and supply to villagers for breeding and upgrading village cows.
3. Production of best healthy bullocks for draught work and preserve male calves for distribution to agriculturists.

## History

1. The Gaushala movement is synonymous with the protection of cows and cattle wealth of our country. Being practiced for the last five thousand years or so, its origin can be traced in the Vedic period when social customs and rules laid great emphasis on protection, preservation and development of cows for home, and oxen for agriculture-fields.
2. According to Vedic concepts, cows were considered sacrosanct and constituted material and spiritual assets of the people of the country. At that time, possession of herds of cows was the yardstick for measuring economic esteem and prosperity of an individual.
3. The Rishis (Ascetics) maintained Asharam Gaushalas, with hundreds of milking cows, which helped them to offer hospitality to visitors. Cow being the backbone of rural life and economy in India, care was taken for their well-being and upliftment.
4. Grazing areas and grasslands were kept reserved in abundance everywhere. People used to donate their lands to Gaushalas on auspicious occasions so that cows may have sufficient land for grazing. Thus the entire culture of ancient India was based on cow.
5. It was in 1946 that the Animal Husbandry wing of the ICAR recognised the potentiality of the valuable work done by gausalas & pinjarapoles and recommended a plan to encourage them to be the fountainheads of milk and draught power in the country. They formulated a plan to constitute state-wise federations of Gausalas & Pinjarapoles.
6. Although the Gosadans established by the Government could not prove to be successful, the Goshalas and Pinjarapoles managed by the community were still running.
7. A report published by the 'Central Council of Gosamvardhan', New Delhi under the heading 'Gaushalas and Pinjarapoles in India' informs that, during the First Five Year Plan, there were nearly 3,000 Gaushalas and Pinjarapoles spread over the whole country. These institutions maintained over six lakh cattle at an annual cost of Rs. 7 crores.
8. It has been realised that, in spite of their drawbacks, these institutions could, with better organisation, very well serve as useful centres for the improvement of cattle and milk production, supplementing Government's efforts in this direction.

## 2 GOSADANS

- The Government of India appointed a 'Cattle Preservation and Development Committee' on November 19th, 1947 under the chairmanship of Sardar Datar Singh, Vice President of the Indian Council of Agricultural Research.
- Along with other issues, the Committee also studied as to how agencies like Gaushalas and Cattle Protection Societies and Salvage Centres could be utilised for preserving cattle wealth and for promoting its development.
- The Committee recommended establishment of 'Gosadans' where 'uneconomic' cattle could be housed cheaply and allowed to die naturally.
- In pursuance of this recommendation a scheme for establishment of 160 Gosadans in the country was included in the first Five Year Plan with an outlay of Rs. 97.15 lakhs with the idea to segregate the old, unproductive and useless cattle from the good ones so as to control promiscuous breeding and also to relieve pressure on the limited resources of feeds and fodder available for the productive stock.

- The segregated cattle are housed in proper shelters or shed and maintained on natural pastures and hay. The scheme was launched to solve the problem of degraded cattle.
- One Gosadan was designed to house 2000 cattle in a land of about 4000 acres. It was estimated that a Gosadan, capable of housing 2000 cattle, would require Rs. 50,000 as non-recurring, and Rs. 20,000 as recurring expenditure per annum.
- The scheme could not achieve the projected targets. Only 17 Gosadans could be started during the plan period. Established in the States of Bihar, UP, Pepsu, Coorg, Bhopal, Kutch, Vindhya Pradesh, Tripura and Saurashtra, these Gosadans could have only 5293 cattle against the capacity of 34,000.
- Lack of funds with the State Governments for meeting their share of expenditure, non-availability of suitable land, absence of legislative measures for the compulsory removal of unproductive cattle from owner's premises, transport difficulties etc. are the reasons generally advanced as to why the 'Gosadan' scheme could not succeed then.

### **3 KEY VILLAGE SCHEME**

- The Key Village Scheme (KVS) was a novel attempt made by independent India towards the development of cattle and buffaloes. The basic aim was to bring about rapid improvement in the production potentiality of milch animals through improved breeding (multiplication of superior germ plasm), effective healthcare, and scientific management and organized marketing facilities.
- It was taken up in August 1952. This was the first step initiated for systematic cattle improvement with the comprehensive programme of
  1. Introduction of superior bulls
  2. Castration of undesirable inferior bulls
  3. Use of artificial insemination
  4. Milk recording
  5. Improved fodder production
  6. Prevention and treatment of diseases
  7. Distribution of mineral feed supplements
- Artificial Insemination (AI) was included as an integral part of the technical programme. It envisaged establishment of Key Village Blocks in breeding tracts of bovines and each block consisted of one AI centre and four key village units to cover about 10,000 breedable cows and buffaloes. The scheme was evaluated at different phases and by 1962 it was very well realized that it failed to evince the desired impact and that too a large number of dairy plants were unable to collect sufficient quantities of milk.
- The reasons for failure include establishment of centers in the states where there were no recognized breeds, creating confusion in the personnel of Animal Husbandry Departments (AHDs) by introducing lot of modifications in the scheme, inadequate attention paid to the fodder development and in establishment of marketing cells.

### **4 INTENSIVE CATTLE DEVELOPMENT PROJECT (ICDP)**

- When KVS did not yield the expected results the Government of India introduced another comprehensive project, Intensive Cattle Development Project (ICDP) almost on the similar lines of Intensive Agricultural District Programme in the year 1963.
- The ICDP was started as a Special Development Programme during Third Five Year Plan. It was envisaged to locate the projects in the breeding tracts of indigenous breeds of cattle and buffaloes and in the milk sheds of large dairy projects. The

establishment of ICDPs was linked with the dairy plants so as to enable the dairy plants to collect and process milk to their full capacities. Each ICDP was expected to cover one lakh breedable female bovine population and to provide necessary inputs and technical services.

#### **Activities of ICDP**

- The activities include conducting Bench mark survey, Controlled breeding, Veterinary aid and disease control, Feeds and fodders and Dairy extension.
- The ICDP was considered as the most determined effort to increase milk production and productivity of cows and buffaloes. However, the Programme Evaluation Organization (1970-71) in its evaluation report indicated that the ICDPs also did not succeed in accomplishing their objectives. The reasons identified were
  - considerable time lag in providing organizational structure and various inputs
  - set back in transferring ICDPs to state sector with financial cuts resulting in dilution of inputs and
  - wastage of semen to the tune of 30 - 40 percent of the semen supplied to project area.
- In addition, a dairy extension officer post created in each and every ICDP to give fillip to the extension activities was not filled up in most of the ICDPs. Even in those places where they were posted were not involved in education of livestock owners and instead their activities were confined mostly to supply of inputs or other non-extension activities.
- At present the ICDPs in many states are merged with the Animal Husbandry programmes and no funds are allocated separately to ICDPs.

#### **5 TECHNOLOGY MISSION ON DAIRY DEVELOPMENT**

- To accelerate the phase of Dairy Development in the country, the Government of India launched Technology Mission on Dairy Development in August 1988. The Mission has assigned 29 need based research programme to research institute of ICAR, State Agricultural Universities and NDDB.

#### **6 SPECIAL LIVESTOCK BREEDING PROGRAMME (SLBP)**

- Based on the recommendations of National Commission on Agriculture (NCA), (1976), Special Livestock Production Programme was launched in 1975-76.
- The main objectives of the programme are
  - to provide employment opportunities to the weaker sections of the rural poor and to supplement their income.
  - to increase the production of livestock products like milk, eggs, wool etc.
- The programme includes crossbred heifer rearing scheme and setting up of sheep, poultry and piggery production units. The expenditure on SLBP is to be shared on 50 : 50 basis between Central and State Governments and cent percent by Central Government to union territories like Pondicherry. Thirty percent of the beneficiaries selected under the programme are to come from SC/ST communities. For setting up of sheep, poultry and piggery units subsidy is provided at the rate of 25 per cent to small farmers and 33 1/3 per cent to marginal farmers and agricultural labourers and 50 % in case of tribal beneficiaries.
- The scheme also aims at assisting the landless agricultural labourers, marginal and small farmers in improving the quality of crossbred heifer calves. The female calves in the age group of 4 to 10 months are included in the scheme. Balanced calf feed is supplied on subsidy to the owners of these selected calves up to 32 months or till the age at first calving whichever is earlier. The calves included in the scheme are also insured by the Department of Animal Husbandry. The purpose of supplying calf feed

to reduce the age at first calving is defeated in many cases because the beneficiaries were offering the calf feed to their cows for immediate benefit (milk production) rather than to their calves to reduce AFC ( long term goal). In some cases the calf feed is being sold by the beneficiaries to the other cattle owners.

## **ANIMAL HUSBANDRY DEVELOPMENT PROGRAMMES - II**

### **7 SHEEP DEVELOPMENT PROGRAMMES**

- Sheep rearing plays a major role in the rural economy and to uplift the people below poverty line.

#### **Objectives of sheep development programmes**

- To improve the socio-economic condition of the rural population in the area of operation through sheep husbandry practices.
- To provide adequate employment for under-employed people in villages through development of small scale cottage industries based on sheep production.
- Provision of adequate infrastructure support including pasture / fodder development for the improvement of sheep, import of exotic breeds of sheep and establishment of exotic breeding farm and ram multiplication farms.
- To bring about improvement in the economic traits of sheep by effective genetic improvement through scientific breeding for more mutton and carpet wool production.
- Distribution of improved rams to selected breeders for breed improvement.
- Provision of in-service training to farmers and project staff, to improve the scientific methods of sheep management practices.
- To augment quality mutton production through improvement in the sheep population.
- Improvement of facilities in respect of health cover, field veterinary extension services and research.
- Improvement of marketing system of sheep
- Improvement of selected slaughter houses for hygienic mutton production.
- Ensuring an effective supervised credit programme for small holders to promote breed improvement, sheep production and marketing through viable farmers, cooperative societies and their federation.

#### **Five Year Plans and sheep development**

- During the second five-year plan period breeding policy for sheep was evolved which included.
  - Selective breeding.
  - Upgrading of non-descriptive breeds with superior breeds.
  - Cross breeding with foreign breeds in selected hilly areas.
- In the third plan period, new sheep breeding established. Old farms expanded and quality rams were supplied to . Further during the fourth plan period, sheep and woolly Extension centres and wool grading-cum marketing centres were established. In the Fifth plan period, cross breeding with woolly type sheep was encouraged. Various programmes were launched during the other plan period also. During the ninth plan period, the production of wool was increased from 43.3 million kg in 1996-97 to 49 million kg in 2001-02. The fine wool production in the country is around 4 million kg.
- The programme of providing exotic males for improvement of sheep in the northern temperate region will continue in the Tenth Plan. A new Centrally Sponsored Scheme "Conservation of threatened livestock breeds of small ruminants, pack animals and equine" to conserve and protect threatened breeds of livestock, has

been initiated during 10th Plan. Under the scheme, assistance is provided to the States for the conservation of sheep, goat, pigs, camels, yak, horse, donkey and ponies. The grant is given through the State Governments to the State Government farms / State Government Undertakings / Boards / Federations / Government Institutes like ICAR, etc. / NGOs / Self-help Groups / farmers / breeders / professional scientists of repute involved in conservation work.

### **Other programmes**

- The government is implementing sheep development programmes through state Animal Husbandry Departments, Rural Development Departments and other Social Welfare Departments. The sheep development programmes like,
  - Special Animal Husbandry Programme
  - Special Assistance Programme
  - Special Central Livestock Breeding Programme
  - Intensive Health Cover for Sheep and
  - EEC assisted sheep development projects were financed by Central and State governments.
- Apart from this assistance was given through other programmes like SFDA, DPAP, HADP, ITDP, IRDP, etc.

### **Constraints**

- Most of the beneficiaries are selected wrongly and the unit cost was found to be inadequate.
- Exploitation by middlemen in the purchase of sheep.
- Untimely assistance and diversion of the loan amount.
- Absence of sufficient fodder banks to meet the demand during drought and also reduction in grazing lands.
- Inadequate infrastructure in production and marketing of sheep and their byproducts, lack of modernization of abattoirs or slaughter houses and carcass utilization plants.

## **8 GOAT DEVELOPMENT PROGRAMMES**

- Despite various adverse comments about the impact of goat rearing on the flora, the number of goats in fact has gone up in recent years. Considerable size of rural community, especially women farmers and landless labourers are rearing one goats. This traditional mini husbandry practices still has its roots throughout rural India because the goats are the poor man's cows.
- They give milk and also meet the farmer's timely needs through selling of kids.
- They are a sort of money-spinners to the poor people. Rural poor below the poverty line are given assistance for purchase of goats. Insurance cover and fodder development are provided to promote goat rearing under various rural development programmes like IRDP, SGSY, NWDPR, Ambedkar Videsh Rojgar Yojna and DANIDA project.
- During the ninth plan period, instead of increasing the goat population, emphasis was made on productivity per animal, organized marketing and prevention of emerging new diseases .

## **9 POULTRY DEVELOPMENT PROGRAMMES**

- Poultry keeping is one of the best tools available for integrated rural development and to bring about socio economic transformation of small entrepreneurs.
- No other branch of agriculture / animal husbandry has made such rapid strides in their development as poultry husbandry.



### **Past efforts**

- Poultry raising in India dates to prehistoric times. The first major step towards poultry development in India was taken during 1939 with the establishment of poultry research division at IVRI, Izatnagar in Uttar Pradesh, which developed an effective vaccine against Ranikhet disease.
- Intensive poultry development made its beginning in the early sixties after the government poultry farms, particularly in Orissa, demonstrated the efficacy of modern poultry rearing. It gained wide popularity with extension activities of the then newly set up veterinary colleges under agricultural universities.
- State Animal Husbandry departments and the American Peace Corps volunteers also helped to popularize modern poultry production in Indian villages.

### **Five Year Plans and poultry development**

- Even in the First Five Year Plan recognition was given to poultry as a vital tool for the socioeconomic upliftment of a large majority in rural areas.
- A pilot project approved in 1956 had the provision to establish 56 extension centres. The scheme was assisted under the Indo-US Technical Cooperation programme.
- In the Second Plan, 5 regional farms equipped with superior stock were started along with 269 poultry extension centres. Training programmes were conducted for private poultry breeders in modern methods of poultry rearing.
- During the Third Plan, poultry farms emerged as vital commercial enterprises. Development of deep litter system, multiplication of exotic breeds and organization of inter-state poultry development projects occurred during this period. Extension cum development centres and commercial hatcheries were set up in different states.
- The fourth Five Year Plan placed much emphasis on breeding better stock and popularizing the latest scientific practices in new areas. Central Government implemented a support programme with tax reduction for income from poultry industry, special credit lines and insurance for poultry against loss through epidemic diseases. Egg and poultry production cum marketing centres were established. Old farms were expanded and new farms were started.
- During the Fifth Plan attempts were made to improve the quality of inputs needed for poultry farming and to establish proper marketing facilities.
- In the Sixth and Seventh Plan periods, all aspects of poultry industry had developed. It was aptly called the 'Decade of Poultry'. Broiler farming emerged as a new wing. The Seventh Plan envisaged improvement in infrastructure for taking up scientific breeding in egg and broiler strains and the proposed development of new lines of broilers. NAFED assisted in the marketing of poultry products.
- In the eighth plan, attempts were made to establish poultry cooperatives on the pattern of Anand in the processing, storage and marketing facilities. State level poultry training centres were started. A task force was set up to work out details of establishment and operation of National Poultry Development Board.
- In the Ninth Plan it was estimated that the egg production in the country is about 33.6 billion numbers (2001-02) against the Ninth Plan target of 35 billion numbers. The significant achievement in poultry development has come from the initiatives taken up by the private sector for commercial pure-line breeding.
- For the Tenth Plan, the present system of production of commercial hybrid broilers and layers has become highly successful. To give a boost to export of poultry products, measures will be undertaken for the development of infrastructure like cold storage, pressured air cargo capacity and reference laboratory for certification of health and products. Programmes will be formulated to improve indigenous birds

and promotion of backyard poultry farming which could help employment generation as well as economic empowerment of poor women in rural areas. There is tremendous scope for exporting poultry products produced from birds fed on organically produced feed.

### **Other efforts**

- Some efforts were made to make more attractive the unorganized sector through a number of central and state sector schemes, notable among them being Intensive Poultry Development Project, Mass Poultry Production Programme involving small/marginal farmers and agricultural labourers emanated from the recommendation of National Commission of Agriculture as a result of which 60 districts were identified in 1975 for introducing poultry production as a component of special scheme called SLBP. The poultry development was also given due consideration under the area development programmes like DPAP, DDP, IRDP, ITDP, etc.
- Various poultry development institutions like Central Poultry Training Institute, Central Duck Breeding Farm, Random Sample Poultry Performance Testing Centres, Regional Feed Analytical Laboratories, etc., were established in various parts of India. The Government of India had increased the total outlay from Rs.28 million during the Second Plan to Rs.602 million during the Seventh Plan for the development of poultry. The Eighth Plan poultry development strategy includes availability of quality chicks, establishment of poultry cooperatives, processing marketing, storage infrastructure facilities, state level poultry training centres and National Poultry Development Board.
- In general, poultry industry in India is proved to be sustainable during the last three to four decades. This was mainly due to the long term strategy with clear objectives by the Government and the private sector, governmental support through incentives, adequate institutional framework and finally flexible regulations for the import of essential inputs. All the inputs like chicks, feed, vaccines, etc., were produced and supplied by private entrepreneurs.

### **10 RABBIT DEVELOPMENT PROGRAMMES**

- In India, rabbit farming is at the infant stage, in a few states, emerging with government assistance through rural development programmes. It is estimated that the rabbit skin constitutes more than 50 per cent of fur trade in international market. India imports about half a million rabbit fur skin annually to meet the demand of fur industry in Jammu and Kashmir state.
- The rabbit fur skin obtained as by-product from the rabbit meat production enterprise can serve as an import substitute. This can also be adopted as a cottage industry to generate employment and income to the rural masses.
- Rabbit production is a boon for the hilly regions of our country. The task force on sheep, goats and rabbit production has recommended that Angora rabbit rearing in temperate regions should be encouraged all over the country.
- Maintenance of breeding lines on scientific grounds for generating highly adaptable and high wool producing breeding stock at a central location, strengthening of extension programme to demonstrate and work hand in hand with the private breeders in implementing the managerial norms for improvement in rabbit production are to be initiated.

## **TRANSFER OF TECHNOLOGY PROJECTS OF INDIAN COUNCIL OF AGRICULTURAL RESEARCH (ICAR):**

### **(1)KRISHI VIGYAN KENDRA**

#### **INTRODUCTION**

- The ICAR has established KVKs in the country in the year 1976 - 77 with an objective of imparting learning through work experience. It also aims at imparting training to extension workers who are already employed and to practicing farmers and fishermen who wish to be self-employed.
- The main characteristic feature of KVK is that there is non-uniform syllabus for the Kendras. Each Kendra has to prepare its syllabus and programmes in tune with the felt needs, natural resources and the potential for agricultural growth in that particular area.

#### **The responsibility of operating the KVKs is entrusted to**

1. Agricultural Universities and ICAR institutes
  2. Voluntary agencies with a good record of serving rural communities especially in backward areas, tribal and hilly areas.
  3. Institutes of Science and Technology and
  4. State Government agencies, in case the above organizations are not available.
- Initially 18 KVKs were established with a budget of Rs.10 lakhs to each KVK. Later efforts were made to establish KVK in each State and now it is contemplated to have one KVK in each district. At present there are 630 KVKs functioning in the country.

#### **MANDATES**

The mandate of KVK was also modified to suit to the changing situations. The mandate of KVK at present includes

1. On-farm testing, refining and documenting of technologies in collaboration with the researchers and extension personnel
2. Organizing training for extension personnel to update their knowledge and skills in advances in agricultural research.
3. Organizing long term vocational training courses for the rural youths with emphasis on learning by doing for generating self-employment through institutional financing.
4. Organizing front line demonstrations in various crops to generate production data and feedback information.

#### **OBJECTIVES**

1. To promptly demonstrate the latest agricultural technologies to the farmers as well as extension workers of the State Department of Agriculture/Horticulture, Animal science, with view to reduce the gap between the technology generation and its adoption.
2. To test and verify the technologies in the socio-economic conditions of the farmers with a view to study the production constraints and to modify the technologies to make them appropriate.
3. To impart training to the practicing farmers/farmwomen, rural youths and field level extension functionaries by following the method of "Teaching by doing" and "Learning by Doing".
4. To back up with training and communication support to the district level development departments in their extension programme.

5. To develop extension models to be adopted by general extension system for large scale multiplication .
6. To get first hand scientific feedback from the fields and passing it to the research system in order to keep the scientists abreast with the performance of the technologies and the farming problems.
7. To bring about improvement in agricultural mechanization in the area through entrepreneurship development in agriculture and related aspects and to improve the socio-economic status of the farming community through transfer of economically viable and environmentally sound technologies on various aspects such as crop[ production, mechanization, horticulture, animal husbandry and women in agriculture.

## **(2) AGRICULTURAL TECHNOLOGY INFORMATION CENTRE (ATIC)**

### **(ATIC: A single window support system)**

The significance of suitable information package and its spreading as one input has understood additional emphasis in the present age of information and technology. The kind of information and the way it is to be used are key factors for the development of agriculture. It is also worth noting that it is no longer enough for research to generate information alone. The required information is also to be delivered to the end users at one place. This information must be direct clear and easily understandable and without providing any scope for distortion.

The foundation stone of agricultural revolution has been the accessibility of improved varieties of crops, breeds of livestock including poultry and fisheries, horticultural plant materials and improved management practices for improved productivity, sustainability and stability of various crop and livestock enterprises. This has raised the hunt by farmers for future availability of seed, planting materials and other materials, trouble-free accessibility to diagnostic services for soil fertility and plant protection, availability of appropriate information through leaflets and pamphlets and increased scope in sale of consultancy services.

Habitually the farmers are not aware as to whom and where to approach for field problems. It is felt that the facilities of a single window approach will enable farmers to have the required information for the solution to their problems related to the areas in which the concerned institute is involved. With these views, the ICAR has taken decision to set up ATICs as a part of World Bank funded National Agricultural Technology Project. In Gujarat, Sardar Krushinagar Dantiwada Agricultural University is having such center.

Agricultural Technology Information Centre (ATIC) a single window support system linking the various units of a research institutes with intermediary users and end users (farmers) in decision making and problem solving exercise.

### **Objectives of the centre:**

1. To provide a single window delivery system for the products and species available from an institution to the farmers and other interested groups as a process of innovativeness in technology dissemination at the institute level.

2. To facilitate farmers to access the institutional resources available in terms of technology, advice, technology products etc. for reducing technology dissemination losses.
3. To provide mechanism for feedback from the users to the institute. In addition to supporting individual farmers groups, public and private agencies in supplying quality materials technology, technologies knowledge etc. The information, services and supplies will include:
  - Soil and water sample testing facilities
  - Plant clinic and diagnostic centre
  - Rhizobium culture
  - Capnteel-organic and bio-pesticide, NPV
  - Seed and planting material, small implements
  - Fertilizer quality testing
  - Insecticide quality testing
  - Tissue culture and plant material
  - Farm literature: leaflets, pamphlets, journal/magazines.
  - Booklets, manuals etc.
  - Audio and video cassettes on crops and other enterprises.
  - Video sheet.
  - Process products: Cereals, milk, meat, fish, vegetable, fruits, mushroom, honey etc.
  - Cafeteria – (Tea/Coffee/Lassi/Cold drinks/Snakes etc.)
  - Technology Park (Display/Exhibition)
  - Veterinary- Animal clinical service for small as well as large animals
  - Poultry hybrids livestock breads, fish seed etc.

Thus major objective of this system is to supply all the information on technologies, techniques, knowledge and materials including planting materials, seeds advisory services, diagnostic services from the one place.

### **(3)Agricultural Technology Management Agency (ATMA)**

#### **What is ATMA?**

ATMA is a society of key stakeholders involved in agricultural activities for sustainable agriculture development in the district. It is a focal point for integrating Research and Extension activities and decentralizing day-to- day management of the public Agricultural Technology System (ATS). It is a registered society responsible for technology dissemination at the district level. As a society, it would be able to receive and expand funds, entering into contracts and agreements and maintaining revolving accounts that can be used to collect fees and thereby recovering operating cost.

#### **Why ATMA?**

The ATMA at district level registered society would be increasingly responsible for all technology dissemination activities at the district level. It would have linkage with all the line departments, research organization, non-governmental organizations and agencies associated with agricultural development in the district. Research and Extension units with in the project district such as ZRS or substations, KVK and the key line departments of Agriculture, Animal Husbandry, Horticulture and Fisheries,

Forestry etc. would become constituent members of ATMA. Each Research-Extension (R-E) unit would retain its institutional identity and affiliation but programme and procedures concerning district-wise R-E activities would be determined by ATMA Governing Board (GB) to be implemented by its Management Committee (AMC):

**Objectives:**

1. To identify location specific needs of farming community for farming system based agricultural development;
2. To set up priorities for sustainable agricultural development with a Farming Systems Approach;
3. To draw plans for production based system activities to be undertaken by farmers/ultimate users;
4. To execute plans through line departments, training institutions, NGOs, farmers organizations and allied institutions;
5. To coordinate efforts being made by various line departments, NGOs, farmers organizations and allied institutions to strengthen research extension-farmers linkages in the district and to promote collaboration and coordination between various State funded technical departments;
6. To facilitate the empowerment of farmers/producers through assistance for mobilization, organization into associations, cooperatives etc. for their increased participation in planning, marketing, technology dissemination and agro-processing.
7. To facilitate market interventions for value addition to farm produce.

**Organizational structure of ATMA:**

ATMA Governing board(GB); ATMA would be supported by Governing Board (GB) and Management Committee (MC). The Governing Board is a policy making body and provide guidance as well as review the progress and functioning of the ATMA.

No.	Composition	
1.	District Magistrate / Collector	Chairman
2.	Chief Executive Officer (CEO) Chief Dev. Officer (CDO)	Vice-Chairman
3.	Joint Director / Deputy Director (Agri.)	Member
4.	A representative from ZRS/ KrishiVigyan Kendra	Member
5.	One Farmer representative	Member
6.	One Livestock Producer	Member
7.	One Horticulture Farmer	Member
8.	Representative of Women Farmers Interest Group	Member
9.	One SC / ST farmer representative	Member
10.	A representative of NGO	Member
11.	Lead Bank Officer of the District	Member
12.	A representative of District Industrial Center	Member
13.	Representative of Agriculture Marketing Board	Member
14.	Representative of input supplying Associations	Member
15.	One Fisheries / Sericulture representative	Member
16.	Project Director ATMA	Member-Secretary-cum-Treasurer (Ex-officio)

**The key functions of ATMA Governing Board would be to:**

1. Review and approve Strategic Research and Extension Plan (SREP) and annual action plans that are prepared and submitted by the participating units.
2. Receive and review annual reports presented by the participating units, providing feedback and direction to them as needed, for various research and extension activities being carried out within the district.
3. Receive and allocate project funds to carry out priority research, extension and related activities within the district.
4. Foster the organization and development of Farmers Interest Groups (FIGs) and Farmers Organizations (FOs) within the district.
5. Facilitate the greater involvement of private sector and firms and organizations in providing inputs, technical support, agro-processing and marketing services to farmers.
6. Encourage agriculture lending institutions to increase the availability of capital to resource poor and marginal farmers, especially SC, ST and women farmers.
7. Encourage each line department, plus the KVK and ZRS, to establish farmer advisory committees to provide feedback and input into their respective R-E Programmes.
8. Enter into contracts and agreements as appropriate to promote and support agricultural development activities within the district.
9. Identify other sources of financial support that would help ensure the financial sustainability of the ATMA and its participating units.
10. Establish revolving funds / accounts for each participating unit, and encourage each unit to make available technical services, such as artificial insemination or soil testing, on a cost recovery basis moving towards full cost recovery in a phased manner.
11. Arrange for the periodic audit of ATMA's financial accounts; and
12. Adopt and amend the rules and by-laws for the ATMA.

**Key functions of Management Committee (MC)**

The functions and tasks to be carried out by the ATMA Management Committee would include the following:

1. Carry out periodic Participatory Rural Appraisal (PRA) to identify the problems and constraints faced by different socio-economic groups and farmers within the district.
2. Prepare an integrated, Strategic Research and Extension Plan (SREP) for the district that would specify short and medium term adaptive research as well as technology validation and refinement and extension priorities for the district: these priorities should reflect during the PRA.
3. Prepare annual action plans that would be submitted to the ATMA Governing Board for review, possible modification and approval.
4. Maintain appropriate project accounts for submission to Technology Dissemination Unit (TDU) for audit purposes.
5. Coordinate the execution of these annual action plans through participant line departments, ZRSs, KVKs, NGOs, FIGs / FOs and allied institutions, including private sector firms.
6. Establish coordinating mechanisms at the Block level, such as Farm Information & Advisory Centres (FIACs) that would integrate extension and technology transfer activities at the block and village levels.
7. Provide annual performance reports to the Governing Board outlining the various research extension and related targets that were actually carried out.

- 8 Provide secretariat to Governing Board and initiate action on policy direction, investment decisions and other guidance received from the Governing Board.

#### **(4) National Agricultural Innovation Project (NAIP):**

Agriculture is and will continue to be the main driver of country's economic growth with social justice. Our agriculture did extremely well and it was on the ascendancy till the mid nineties but after that the growth slowed down. Since 1996-97 the growth rate of agricultural GDP has been, on an average, 1.75 % per year in contrast with the rate of 4% that is required. On the other hand the farmer has been facing rising input costs, declining returns from the inputs, uncertain market, increasing role of market in agriculture and blurring of distinction between the domestic market and the international market. To assist the farmer in these changing contexts new strategies and innovative solutions are urgently required which in turn will require technological support. Hence the agricultural research system which generates technologies, has to conduct the business of agricultural research in an innovative way. The World Bank aided National Agricultural Innovation Project (NAIP) has been conceived to pilot this innovation in conducting agricultural research.

#### **The Basic Principles**

1. To give the agricultural research and technology development system an explicit development and business perspective through innovative models. In other words, the agricultural research system should be able to support agriculture as a business venture and also as a means of security of livelihood of the rural Indian while maintaining excellence in science.
2. To make the National Agricultural Research System a 'pluralistic' system where every Organisation having stake in agricultural research: public, private or civil society, has to play a role.
3. Working in well defined partnership groups with clear common goals and understanding on sharing responsibilities and benefits.
4. Funding through competition so that a wide choice of excellent innovative ideas come in from the stakeholders themselves.
5. Work with focus, plan and time frames.

Develop well-tested models for application of agricultural research and technology for profitability of farming, income generation and poverty alleviation.

#### **Components of NAIP**

The NAIP will function through four components:

1. The ICAR as the Catalyzing Agent for the Management of Change in the Indian NARS
2. Research on Production to Consumption Systems (PCS)
3. Research on Sustainable Rural Livelihood Security (SRLS) and
4. Basic and Strategic Research in the Frontier Areas of Agricultural Sciences (BSR)

#### **(5) Rashtriya Krishi Vikas Yojana (RKVY):**

- 1 RKVY scheme was initiated in 2007 as an umbrella scheme for ensuring holistic development of agriculture and allied sectors by allowing states to choose their own agriculture and allied sector development activities as per the district/state agriculture plan. The scheme has come a long way since its inception and has been implemented across two plan periods (11<sup>th</sup> and 12<sup>th</sup>). Till 2013-14, the scheme was implemented as an Additional Central Assistance (ACA) to State Plan Scheme with 100% central assistance. It was converted into a Centrally Sponsored Scheme in 2014-15 also with 100% central assistance. Since 2015-16, the funding pattern of the



scheme has been altered in the ratio of 60:40 between Centre and States (90:10 for North Eastern States and Himalayan States). For Union Territories the funding pattern is 100 % central grant.

2. RKVY scheme incentivizes States to increase public investment in Agriculture & allied sectors. Under RKVY, States have been provided flexibility and autonomy for selection, planning approval and execution of projects/programs under the scheme as per their need, priorities and agro-climate requirements. The funds are released to the State Governments/UTs on the basis of projects approved in the State Level Sanctioning Committee Meeting (SLSC) headed by the Chief Secretary of the concerned State, which is the empowered body to approve projects under the scheme. It is for the State Govt. to further implement the scheme in the State as per its requirement in areas which requires focused attention for increasing production and productivity in the State.
3. The Cabinet has approved ( as on 1st November 2017) for continuation of the ongoing Centrally Sponsored Scheme (State Plans) - Rashtriya Krishi Vikas Yojana (RKVY) as Rashtriya Krishi Vikas Yojana- Remunerative Approaches for Agriculture and Allied Sector Rejuvenation (RKVY-RAFTAAR) for three years i.e. 2017-18 to 2019-20 with a financial allocation of Rs. 15,722 crors with broad objectives of making farming a remunerative economic activity through strengthening the farmer's effort, risk mitigation and promoting agri-business entrepreneurship. Under RKVY-RAFTAAR, major focus is on pre & post-harvest infrastructure, besides promoting agri-entrepreneurship and innovations.
4. Funds under RKVY-RAFTAAR would be provided to the States as grant by the Central Government in the following streams.
  - A. Regular RKVY-RAFTAAR -70% of annual outlay will be allocated among States as per criteria.**
  - B. RKVY-RAFTAAR special sub-schemes - 20% of total annual outlay -** based on national priorities as notified by Govt. of India from time to time for development of region and problem specific areas.
  - C. Innovation and agri-entrepreneur development - 10% of annual outlay-**for encouraging innovation and agri-entrepreneurs through skill development and financial support. It will support incubatees, incubation centers, KVKs, awards etc. These funds will be with Central Govt. (DAC&FW) including 2% of administrative costs at the Centre. In case the funds not utilized, it will be diverted to regular RKVY & sub-schemes.

#### **Objectives of RKVY-RAFTAAR**

Aims at making farming a remunerative economic activity through strengthening the farmers' effort, risk mitigation and promoting agri-business entrepreneurship.

#### **The main objectives of the scheme are**

- (i) To strengthen the farmers' efforts through creation of required pre and post – harvest agri-infrastructure that increases access to quality inputs, storage, market facilities etc. and enables farmers to make informed choices.
- (ii) To provide autonomy, flexibility to States to plan and execute schemes as per local/ farmers' needs. To promote value chain addition linked production models that will help farmers increase their income as well as encourage production/productivity
- (iv) To mitigate risk of farmers with focus on additional income generation activities - like integrated farming, mushroom cultivation, bee keeping, aromatic plant cultivation, floriculture etc.

(v) To attend national priorities through several sub-schemes.

(vi) To empower youth through skill development, innovation and agri-entrepreneurship based agribusiness models that attract them to agriculture.

5. Animal Husbandry Semen collection and Artificial Insemination (AI) Units/Production Center Breeding farms Dispensaries/Hospitals for treatment of Animals Vaccine Production Unit Diagnosis Labs, including Mobile Units Animal Ambulance Cold Chain for storing and transportation of frozen Semen Tractor fitted with Fodder Block machine Carcass rendering Plant to collect the fallen animals for Processing /utilization in scientific manner Modernization of animal slaughter houses\* and markets for livestock /livestock products Establish/Strengthening of Cold Chain Infrastructure for storage of Veterinary Biological. Establishment/Strengthening of Check post/Quarantine camps for restriction of animal movement, strengthening of animal disease reporting system.

## **ECONOMICS PRINCIPALS UNDERLYING CO-OPERATIVE SOCIETIES**

### **DEFINITIONS**

- **Co-operative** has been defined as a form of organization in which persons voluntarily associate together on the basis of equality for the promotion of their economic interest. Those who have come together have a common economic aim, which they cannot achieve because of their economic weakness this element of individual weakness is overcome by the pooling of their resources, by making self-help effective through mutual help.
- **A co-operative organisation** is an association which furnishes an economic service with entrepreneur profit and which is owned and controlled on a substantially equal basis by those for whom the service is rendered.
- **A co-operative society** is an enterprise formed and directed by an association of users, applying within itself the rules of democracy and directly intended to serve both its members and the community as a whole.

### **OBJECTIVES OF CO-OPERATIVES**

- **Economic objective**
  - Co-operative as an institution caters to the members needs based on self-help.
  - It needs the mutual cooperation of the members and workers for their own benefit and consequently for that of the community as a whole.
  - The overall economic objective of the cooperatives is the welfare of the members of the society through supply of cheap credit, development of banking habits, secure better price for farm produce, eliminating exploitation by middle men and creation of storage facilities for the produce until sold at appropriate time.
- **Social objective**
  - It is to develop democratic leadership and to motivate people to opt for voluntary participation and group action. Individuals are treated equal without any discrimination.
  - It also aims at industry, self-reliance and mutual help. It fosters a sense of responsibility and integrity. It brings a sense of security and harmony among the members.
- **Educational objective**
  - It is to bring about knowledge of cooperatives to its participants and to develop responsibility and honesty among the members.

## PRINCIPLES OF CO-OPERATION

- The co-operative principles are guidelines by which co-operatives put their values into practice. Cooperative movement made its first appearance in England.
- It was started to give relief to persons exploited by middlemen during the Industrial Revolution. About 28 poor weavers of Rochdale came together with the capital of one pound each to open a small retail shop in 1844.
- They adopted a set of rules, which was later known as Rochdale Principles and was accepted worldwide as the cooperative principles.

## ROCHDALE PRINCIPLES OF CO-OPERATION

- The Rochdale principles of co-operation are
  1. Democratic control
  2. Open membership
  3. Limited interest on capital
  4. Distribution of the surplus to the members in proportion to their transactions
  5. Cash trading
  6. Political and religious neutrality
  7. Promotion of education

## REVISED CO-OPERATIVE PRINCIPLES

- With the eventual growth in science and technology and diversification in cooperative business, it was felt that the Rochdale principles needed some modification, clarifications and adjustments.
- Consequently the International Cooperative Alliance (ICA) appointed a subcommittee in 1934 for this purpose.
- The committee in its report (1937) classified these principles into two broad groups as follows:

Essential principles	Non essential principles
Open membership	Political and religious neutrality
Democratic management	Cash trading
Limited interest on capital	Education to members
Payment of dividend in proportion to transaction	

### 1 Voluntary and open membership

Co-operatives are voluntary organisations, open to all persons able to use their services and willing to accept the responsibilities of membership, without gender, social, racial, political or religious discrimination.

### 2 Democratic member control

- Co-operatives are democratic organisations controlled by their members, who actively participate in setting their policies and making decisions.
- Men and women serving as elected representatives are accountable to the membership. In primary co-operatives members have equal voting rights (one member, one vote) and co-operatives at other levels are also organised in a democratic manner.

### **3 Member economic participation**

- Members contribute equitably to, and democratically control, the capital of their co-operative. At least part of that capital is usually the common property of the co-operative.
- Members usually receive limited compensation, if any, on capital subscribed as a condition of membership.
- Members allocate surpluses for any or all of the following purposes: developing their co-operative, possibly by setting up reserves, part of which at least would be indivisible; benefiting members in proportion to their transactions with the co-operative; and supporting other activities approved by the membership.

### **4 Autonomy and independence**

- Co-operatives are autonomous, self-help organisations controlled by their members.
- If they enter to agreements with other organisations, including governments, or raise capital from external sources, they do so on terms that ensure democratic control by their members and maintain their co-operative autonomy.

### **5 Education, training and information**

- Co-operatives provide education and training for their members, elected representatives, managers, and employees so they can contribute effectively to the development of their co-operatives.
- They inform the general public - particularly young people and opinion leaders - about the nature and benefits of co-operation.

### **6 Co-operation among co-operatives**

Co-operatives serve their members most effectively and strengthen the co-operative movement by working together through local, national, regional and international structures.

### **7 Concern for community**

Co-operatives work for the sustainable development of their communities through policies approved by their members.

### **Advantages and limitations of co-operative:**

- 1. Easy to form:** The formation of a cooperative society is very simple as compared to the formation of any other form of business organisations. Any ten adults can join together and form a cooperative society. The procedure involves in the registration of a cooperative society is very simple and easy. No legal formalities are required for the formation of cooperative society.
- 2. No obstruction for membership:** Unless and otherwise specifically debarred, the membership of cooperative society is open to everybody. Nobody is obstructed to join on the basis of religion, caste, creed, sex and colour etc. A person can become a member of a society at any time he likes and can leave the society when he does not like to continue as ; member.
- 3. Limited liability:** In most cases, the liabilities of the members of the society are limited to the extent of capital contributed by them. Hence, they are relieved from the fear of attachment of their private property, in case of the society suffers financial losses.
- 4. Service motive:** In Cooperative society members are provided with better good and services at reasonable prices. The society also provides financial help to its members

on the concessional rates. It assists in setting up production units and marketing of produces small business houses to small farmers for their agricultural products.

- 5. Democratic management:** The cooperative society is managed by the elected members from and among themselves. Every member has equal rights through its single vote but can take active part in' the formulation of the policies of the society. Thus all member are equally important for the society.
- 6. Stability and continuity:** A cooperative society cannot be dissolved by the death insolvency, lunacy, permanent incapability of the members. Therefore, it has stable life are continues to exist for a longer period. It has got separate legal existence. New members join and old members may quit the society but society continues to function unless are otherwise all members unanimously decided to close the same.
- 7. Economic operations:** The operation carried on by the cooperative society economical due to the eliminations of middlemen. The services of middlemen are provided by the members of the society with the minimum cost. In the case of cooperative society, the recurring and non-recurring expenses are very less. Further, the economies of scale-ma production or purchase, automatically reduces the procurement price of the goods, thereby minimizes the selling price.
- 8. Surplus shared by the members:** The society sells goods to its members on a nominal profit. In some cases, the society sells goods to outsiders. This profit is utilised for meeting the day-to-day administration cost of the society. The procedure for distribution of profit that some portion of the surplus is spent for the welfare of the members, some portion kept reserve whereas the balance shared among the members as dividend on the basis of this purchase.
- 9. State patronage:** Government provides special assistance to the societies to enable them to achieve their objectives successfully. Therefore, the societies are given financial lo< at lower rates. Government also extends many type of subsidies to cooperative societies strengthening their financial stability and sustainable growth in future.

**Disadvantages of Cooperative Society:** Despite many an advantages, the cooperative society suffer from certain limitations drawbacks. Some of these limitations, which a cooperative form of business has are as follows:

- 1. Limited resources:** Cooperative society's financial strength depend on the cap contributed by its members and loan raising capacity from state cooperative banks. The membership fee is limited for which they are unable to raise large amount of resources as their members belong to the lower and middle class. Thus, cooperative are not suitable for the large scale business which require huge capital.
- 2. Inefficient management:** A cooperative society is managed by the members only. They do not possess any managerial and special skills. This is considered as major drawback of this sector. Inefficiency of management may not bring success to the societies.
- 3. Lack of secrecy:** The cooperative society does not maintain any secrecy in business because the affairs of the society is openly discussed in the meetings. But secrecy is

very important for the success of a business organisation. This paved the way for competitors to compete in more better manner.

- 4. Cash trading:** The cooperative societies sell their products to outsiders only in cash. But, they are usually from the poor sections. These persons require to avail credit facilities which is not possible in the case of cooperatives. Hence, marketing is a shortcoming for the cooperatives.
- 5. Excessive Government interference:** Government put their nominee in the Board of management of cooperative society. They influence the decision of the Board which may or may not be favourable for the interest of the society. Excessive state regulation, interference with the flexibility of its operation affects adversely the efficiency of the management of the society.
- 6. Absence of motivation:** The members may not feel enthusiastic because the law governing the cooperatives put some restriction on the rate of return. Absence of relationship between work and reward discourage the members to put their maximum effort in the society.
- 7. Disputes and differences:** The management of the society constitutes the various types of personnel from different social, economical and academic background. Many a times they strongly differs from each other on many important issues. This becomes detrimental to the interest of the society. The different opinions and disputes may paralyses the effectiveness of the management.

#### **Co-operative milk unions in India:**

Amul is an Indian dairy cooperative, based at Anand in the state of Gujarat, India. The word *Amul* is derived from the Sanskrit word *Amulya*, meaning invaluable. The co-operative is also sometimes referred to by the unofficial backronym: *Anand Milk Union Limited*. Formed in 1946, it is a brand managed by a cooperative body, the Gujarat Co-operative Milk Marketing Federation Ltd. (GCMMF), which today is jointly owned by 3.03 million milk producers in Gujarat. Amul spurred India's *White Revolution*, which made the country the world's largest producer of milk and milk products. In the process Amul became the largest food brand in India and has also ventured into markets overseas. Dr. Verghese Kurien, founder-chairman of the GCMMF for more than 30 years (1973–2006), is credited with the success of Amul.

#### **History:**

The Kaira District Co-operative Milk Producers' Union Ltd. was registered on 1 December 1946 as a response to the exploitation of marginal milk producers by traders or agents of the only existing dairy, the Polson (brand) dairy, in the small town of Anand (in Kaira District of Gujarat). Milk Producers had to travel long distances to deliver milk, which often went sour in summer, to Polson. The prices of buffalo and cow milk were arbitrarily determined. Moreover, the government at that time had given monopoly rights to Polson to collect milk from Anand and supply it to Bombay city.

Angered by the unfair and manipulative trade practices, the farmers of Kaira approached *Sardar Vallabhbhai Patel* under the leadership of local farmer leader Tribhuvandas K. Patel. He advised them to form a cooperative and supply milk directly to the Bombay Milk Scheme instead of Polson (who did the same but gave them low prices). He sent Morarjibhai Desai to organize the farmers. In 1946, the milk farmers of the area went on a strike which led to the setting up of the cooperative to

collect and process milk. Milk collection was also decentralized, as most producers were marginal farmers who could deliver atmost 1–2 litres of milk per day. Cooperatives were formed for each village too.

The Cooperative was further developed and managed by Dr.Vergheese Kurien along with H.M. Dalaya. Dalaya's innovation of making skim milk powder from buffalo milk for the first time anywhere in the world and a little later, along with Kurien's help, making it on a commercial scale, led to the first modern dairy of the cooperative at Anand, which would successfully compete against established players in the market.

The trio's (T. K. Patel, Kurien and Dalaya's) success at the cooperative's dairy soon spread to Anand's neighborhood in Gujarat, and within a short span, five unions in other districts – Mehsana, Banaskantha, Baroda, Sabarkantha and Surat were set up. In order to combine forces and expand the market while saving on advertising and avoid competing against each other, the GCMMF, an apex marketing body of these district cooperatives was set up in 1973. The Kaira Union which had the brand name of *Amul* with it since 1955, transferred it to GCMMF.

Company info: The GCMMF is the largest food products marketing organization of India. It is the apex organization of the Dairy Cooperatives of Gujarat. Over the last five and a half decades, Dairy Cooperatives in Gujarat have created an economic network that links more than 3.1 million village milk producers with millions of consumers in India. These cooperatives collect on an average 9.4million litres of milk per day from their producer members, more than 70% of whom are small, marginal farmers and landless labourers and include a sizeable population of tribal folk and people belonging to the scheduled

The turnover of GCMMF (AMUL) during 2010–11 was ₹97.74 billion (US\$1.8 billion). It markets the products, produced by the district milk unions in 30 dairy plants. The farmers of Gujarat own the largest state of the art dairy plant in Asia – Mother Dairy, Gandhinagar, Gujarat – which can handle 3.0 million litres of milk per day and process 160 MTs of milk powder daily. Amul Dairy established at Anand is the crown glory of the district. By launching the milk business in a scientific way, the dairy heralded White Revolution in Gujarat which is well established now. The dairy has provided the farmers an important source of supplementary income through animal husbandry. Today it has become a world renowned organisation.

The Three-tier "Amul Model": The Amul Model is a three-tier cooperative structure. This structure consists of a Dairy Cooperative Society at the village level affiliated to a Milk Union at the District level which in turn is further federated into a Milk Federation at the State level. The above three-tier structure was set up in order to delegate the various functions, milk collection is done at the Village Dairy Society, Milk Procurement & Processing at the District Milk Union and Milk & Milk Products Marketing at the State Milk Federation. This helps in eliminating not only internal competition but also ensuring that economies of scale are achieved. As the above structure was first evolved at Amul in Gujarat and thereafter replicated all over the country under the Operation

Flood Programme, it is known as the 'Amul Model' or 'Anand Pattern' of Dairy Cooperatives.

- Responsible for Marketing of Milk & Milk Products
- Responsible for Procurement & Processing of Milk
- Responsible for Collection of Milk
- Responsible for Milk Production

**The main functions of the amul are as follows:**

1. Collection of surplus milk from the milk producers of the village & payment based on quality & quantity
2. Providing support services to the members like Veterinary First Aid, Artificial Insemination services, cattle-feed sales, mineral mixture sales, fodder & fodder seed sales, conducting training on Animal Husbandry & Dairying, etc.
3. Selling liquid milk for local consumers of the village
4. Supplying milk to the District Milk Union

Thus, the VDCS is an independent entity managed locally by the milk producers and assisted by the District Milk Union.

**District Cooperative Milk Producer's Union (Dugdh Sangh)**

The main functions of the Union are as follows:

- Procurement of milk from the Village Dairy Societies of the District
- Arranging transportation of raw milk from the VDCS to the Milk Union.
- Providing input services to the producers like Veterinary Care, Artificial Insemination services, cattle-feed sales, mineral mixture sales, fodder & fodder seed sales, etc.
- Conducting training on Cooperative Development, Animal Husbandry & Dairying for milk producers and conducting specialized skill development & Leadership Development training for VDCS staff & Management Committee members.
- Providing management support to the VDCS along with regular supervision of its activities.
- Establish Chilling Centre & Dairy Plants for processing the milk received from the villages.
- Selling liquid milk & milk products within the District
- Process milk into various milk & milk products as per the requirement of State Marketing Federation.
- Decide on the prices of milk to be paid to milk producers as well on the prices of support services provided to members.

**State Cooperative Milk Federation (Federation):**

The main functions of the Federation are as follows:

- Marketing of milk & milk products processed / manufactured by Milk Unions.
- Establish distribution network for marketing of milk & milk products.
- Arranging transportation of milk & milk products from the Milk Unions to the market.
- Creating & maintaining a brand for marketing of milk & milk products (brand building).
- Providing support services to the Milk Unions & members like Technical Inputs, management support & advisory services.
- Pooling surplus milk from the Milk Unions and supplying it to deficit Milk Unions.
- Establish feeder-balancing Dairy Plants for processing the surplus milk of the Milk Unions.



- Arranging for common purchase of raw materials used in manufacture / packaging of milk products.
- Decide on the prices of milk & milk products to be paid to Milk Unions.
- Decide on the products to be manufactured at various Milk Unions (product-mix) and capacity required for the same.
- Conduct long-term Milk Production, Procurement & Processing as well as Marketing Planning.
- Arranging Finance for the Milk Unions and providing them technical know-how.
- Designing & Providing training in Cooperative Development, Technical & Marketing functions.
- Conflict Resolution & keeping the entire structure intact.

Today, there are around 176 cooperative dairy Unions formed by 1.25 lakh dairy cooperative societies, having a total membership of around 13 million farmers on the same pattern, who are processing and marketing milk and milk products profitably, be it Amul in Gujarat or Verka in Punjab, Vijaya in Andhra Pradesh, Milma in Kerala, Gokul in Maharashtra, Saras in Rajasthan or a Nandini in Karnataka. This entire process has created more than 190 dairy processing plants spread all over India with large investments by these farmers' institutions. These cooperatives today collect approximately 23 million kg. of milk per day and pay an aggregate amount of more than Rs.125 billion to the milk producers in a year

#### **Impact of the "Amul Model":**

The effects of Operation Flood Programme are more appraised by the World Bank in its recent evaluation report. It has been proved that an investment of Rs. 20 billion over 20 years under Operation Flood Programme in 70s & 80s has contributed in increase of India's milk production by 40 Million Metric Tonne (MMT) i.e. from about 20 MMT in pre- Operation Flood period to more than 60 MMT at the end of Operation flood Programme. Thus, an incremental return of Rs. 400 billion annually have been generated by an investment of Rs. 20 billion over a period of 20 years. This has been the most beneficial project funded by the World Bank anywhere in the World. One can continue to see the effect of these efforts as India's milk production continues to increase and now stands at 90 MMT. Despite this fourfold increase in milk production, there has not been drop in the prices of milk during the period and has continued to grow.

Due to this movement, the country's milk production tripled between the years 1971 to 1996. Similarly, the per capita milk consumption doubled from 111 gm per day in 1973 to 222 gm per day in 2000. Thus, these cooperatives have not just been instrumental in economic development of the rural society of India but it also has provided vital ingredient for improving health & nutritional requirement of the Indian society. Very few industries of India have such parallels of development encompassing such a large population.

These dairy cooperatives have been responsible in uplifting the social & economic status of the women folk in particular as women are basically involved in dairying while the men are busy with their agriculture. This has also provided a definite source of income to the women leading to their economic emancipation.

The three-tier 'Amul Model' has been instrumental in bringing about the White Revolution in the country. As per the assessment report of the World Bank on the

Impact of Dairy Development in India, the 'Anand Pattern' has demonstrated the following benefits:

- is has multi-dimensional impacts
- importance of getting government out of commercial enterprises
- importance of market failure in agriculture
- power & problems of participatory organizations
- importance of policy correct

#### **Achievements of the "Amul Movement**

1. The dairy cooperatives have been able to maintain democratic structure at least at the grass-root level with the management committee of the village level unit elected from among the members in majority of the villages.
2. The dairy cooperatives have also been instrumental in bridging the social divide of caste, creed, race, religion & language at the villages, by offering open and voluntary membership.

#### **Achievements of GCMMF**

1. 3.1 million milk producer member families
2. 15,760 village societies
3. 15 District Unions
4. 9.4 million liters of milk procured per day
5. ₹150 million (US\$2.8 million) disbursed in cash daily.
6. GCMMF is the largest cooperative business of small producers with an annual turnover of ₹53 billion (US\$980 million).
7. The Govt. of India has honored Amul with the "Best of all categories Rajiv Gandhi National Quality Award".
8. Largest milk handling capacity in Asia
9. Largest cold chain network
10. 48 Sales offices, 5000 wholesale distributors, 7 lakh retail outlets
11. Export to 37 countries worth ₹150 crore (US\$28 million)
12. Winner of APEDA award for eleven consecutive years

#### **The Amul brand**

GCMMF (AMUL) has the largest distribution network for any FMCG company. It has nearly 50 sales offices spread all over the country, more than 5 000 wholesale dealers and more than 700 000 retailers. Amul became the world's largest vegetarian cheese and the largest pouched-milk brand.

AMUL is also the largest exporter of dairy products in the country. AMUL is available today in over 40 countries of the world. AMUL is exporting a wide variety of products which include Whole and Skimmed Milk Powder, Cottage Cheese (Paneer), UHT Milk, Clarified Butter (Ghee) and Indigenous Sweets. The major markets are USA, West Indies, and countries in Africa, the Gulf Region, and SAARC neighbours, Singapore, The Philippines, Thailand, Japan and China, and others such as Mauritius, Australia, Hong Kong and a few South African countries. Its bid to enter the Japanese market in 1994 did not succeed, but it plans to venture again.

In September 2007, Amul emerged as the leading Indian brand according to a survey by Synovate to find out Asia's top 1000 Brands.

In 2011, Amul was named the Most Trusted brand in the Food and Beverages sector in The Brand Trust Report, published by Trust Research Advisory. rediff.com; "India's top 20 brands: Amul is No. 1"

### **Operation Flood:**

In India, a project of the National Dairy Development Board (NDDB) was the world's biggest dairy development programme which made India, a milk-deficient nation, the largest milk producer in the world, surpassing the USA in 1998, with about 17 percent of global output in 2010–11, which in 30 years doubled the milk available per person, and which made dairy farming India's largest self-sustainable rural employment generator. All this was achieved not merely by mass production, but by production by the masses.

The *Anand pattern experiment at Amul*, a single, cooperative dairy, was the engine behind the success of the programme. Verghese Kurien was made the chairman of NDDB by the then Prime Minister of India, ShriLal Bahadur Shastri, and he was the chairman and founder of Amul as well. Kurien gave the necessary thrust using his professional management skills to the programme, and is recognised as its architect.

### **Introduction**

Operation Flood has created a national milk grid linking milk producers throughout India with consumers in over 700 towns and cities, reducing seasonal and regional price variations while ensuring that the producer gets a major share of the price consumers pay, by cutting out middlemen. By reducing malpractices, it has helped dairy farmers direct their own development, placing control of the resources they create in their own hands.

The bedrock of Operation Flood has been village milk producers' co-operatives, which procure milk and provide inputs and services, making modern management and technology available to members. Operation Flood's objectives included:

- Increase milk production ("a flood of milk")
- Augment rural incomes
- Fair prices for consumers

### **Programme implementation**

#### **Phase I**

Phase I (1970–1980) was financed by the sale of skimmed milk powder and butter and oil donated by the European Union (then the European Economic Community) through the World Food Programme. NDDB planned the programme and negotiated the details of EEC assistance.

During its first phase, Operation Flood linked 18 of India's premier milksheds with consumers in India's major metropolitan cities: Delhi, Mumbai, Kolkata and Chennai. Thus establishing mother dairies in four metros. The Operation Flood – 1 originally meant to be completed in 1975, actually spanned the period of about nine years from 1970–79, at a total cost of Rs.116 crores.

At start of operation Flood-1 in 1970 certain set of aims were kept in view for the implementation of the programmes. Improvement by milk marketing the organized dairy sector in the metropolitan cities Mumbai (then Bombay), Kolkata(then Calcutta), Chennai(then Madras) and Delhi. The objectives of commanding share of milk market and speed up development of dairy animals respectively hinter lands of rural areas with a view to increase both production and procurement.

#### **Phase II**

Operation Flood Phase II (1981–1985) increased the milk sheds from 18 to 136; 290 urban markets expanded the outlets for milk. By the end of 1985, a self-sustaining system of 43,000 village cooperatives with 4,250,000 milk producers were covered. Domestic milk powder production increased from 22,000 tons in the pre-project year to 140,000 tons by 1989, all of the increase coming from dairies set up under Operation

Flood. In this way EEC gifts and World Bank loan helped promote self-reliance. Direct marketing of milk by producers' cooperatives increased by several million litres a day.

### **Phase III**

Phase III (1985–1996) enabled dairy cooperatives to expand and strengthen the infrastructure required to procure and market increasing volumes of milk. Veterinary first-aid health care services, feed and artificial insemination services for cooperative members were extended, along with intensified member education.

Operation Flood's Phase III consolidated India's dairy cooperative movement, adding 30,000 new dairy cooperatives to the 42,000 existing societies organized during Phase II. Milk-sheds peaked to 173 in 1988-89 with the numbers of women members and Women's Dairy Cooperative Societies increasing significantly.

Phase III gave increased emphasis to research and development in animal health and animal nutrition. Innovations like vaccine for theileriosis, bypassing protein feed and urea-molasses mineral blocks, all contributed to the enhanced productivity of milk producing animals.

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