e-READING MANUAL

AEX-121

FUNDAMENTALS

OF

AGRICULTURAL EXTENSION EDUCATION

3 (2+1)

B.Sc. (Hons.) Agriculture

Prepared by

Dheeraj Mishra

B.K. Gupta

Pankaj Kumar Ojha

Arjun Prasad Verma

B.P. Mishra

Department of Agricultural Extension
College of Agriculture
Banda University of Agriculture and Technology
Banda, (UP) - 210001

e-Reading Manual on
Fundamentals of Agricultural Extension Education

Year
January, 2022

Prepared by:
Dheeraj Mishra
B.K. Gupta
Pankaj Kumar Ojha
Arjun Prasad Verma
B.P. Mishra

FOREWORD

I am pleased to learn that the Department of Agricultural Extension is bringing out the e-reading manual of AEX-121: Fundamentals of Agricultural Extension Education for the students of B.Sc. (Hons.) Agriculture. The university has always been supportive for providing all sort of help in facilitating the best teaching and learning environment. This e-reading manual will be helpful to improve students' understanding of the subject and easily accessible all the time. With this e-reading manual, the students will be able to develop their skills for better performance in academics and in the professional field as well.

I appreciate the tireless efforts of the faculty members of the Department of Agricultural Extension in developing and designing this manual.I am sure that this reading manual will be very useful to the students registered for the course of 'Fundamentals of Agricultural Extension Education'. This manual will work as a ready reckoner for the students to help them in preparation of competitive examination for higher studies.

With best wishes,

(G.S. Panwar)
Dean
College of Agriculture
Banda University of Agriculture and Technology
Banda-210001 (UP)

PREFACE

Agricultural extension is a key to sustainable agricultural development. The global change in economic policies and advancement in technologies have brought a complete shift in extension approaches worldwide. It has introduced new trends such as market led extension, cyber extension and private extension to the discipline. In view of this, ICAR nominated the 5th Dean's Committee to suggest relevant modification and changes in the course curricula of all disciplines at UG level.

This e-reading manual on AEX-121: Fundamentals of Agricultural Extension Education is designed as per the revised curricula of B.Sc. (Hons.) Agriculture programme recommended by the 5th Dean's Committee of ICAR. The new chapters were added as per the revision and incorporated in such a way that made it easily understandable to the students to make it more clear and attractive. Pictures, graphs, figures, etc. are used at appropriate places. This manual is a combined effort of all the faculty members of the Department of Agricultural Extension, for which I am thankful for my teammates.

On behalf of authors and as a Head of Department of Agricultural Extension, I acknowledge with thanks to Dr. N.P. Singh, Hon'ble Vice Chancellor, BUAT, Banda and Dr. G.S. Panwar, Dean, College of Agriculture, BUAT, Bandafor encouraging us to bring out this e-reading manual.

With best wishes,

(B.P. Mishra)
Head
Department of Agricultural Extension
College of Agriculture
BUAT, Banda

CONTENT

Chapter 1
Education: Meaning, Definition & Types

Education

Education is the process of developing capability of the individual so that they can adequately response to their situation. It is the process of bringing desirable change into the behaviour of human being in terms of knowledge, attitude, skill, values and habits. Education take place them self as well as in front of instructor. Education can take place in formal or informal settings and any experience that has a formative effect on the way one thinks, feels or acts may be considered education.

Types of Education

There are mainly three types of education, namely, Formal, Informal and Non-formal. Description of different types of education is briefly given below.

a. Formal Education

Formal education corresponds to a systematic, organized education model, structured and administered according to a given set of laws and norms, presenting a rather rigid curriculum as regards objectives, content and methodology. It is characterized by a contiguous education process named, as Sarramona1 remarks, "presential education", which necessarily involves the teacher, the students and the institution. It corresponds to the education process normally adopted by our schools and universities.

- Planned with a particular end in view.
- Limited to a specific period.
- Well-defined and systematic curriculum
- Given by specially qualified teachers.
- Includes activities outside the classroom
- Observes strict discipline.

b. Informal Education

Informal education is quite diverse from formal education and, particularly, from non- formal education, although in certain cases it is capable of maintaining a close relationship with both. It does not correspond to an organized and systematic view of education; informal education life long process in which portionsazure's knowledge, skill, attitude and insight from daily experiences and exposure to the endearment at home.

a. Incidental and spontaneous

b. Not-pre-planned.
c. Not imparted by any specialised agency.
d. No prescribed time-table or curriculum.
e. May be negative also

c. *Non-formal Education*
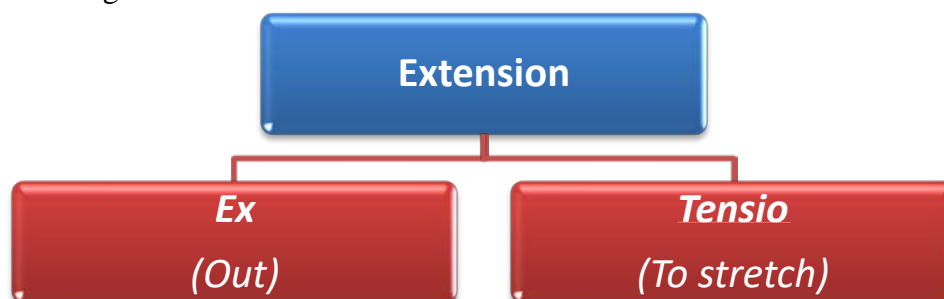
It is organized and systematic education activity carried on outside the frame work of the formal system to provide selected type of learning to the particular group of population.
a. Derived from the expression 'formal education.
b. Outside the realm of formal education.
c. Conscious and deliberate.
d. To be organised for a homogeneous group.
e. Serving the need of the identified group.

Extension Education- Meaning, Definition and Scope

Extension Education

Extension word is derived from the Latin root 'ex' meaning out and 'tension' meaning stretching.

```
            ┌─────────────────────┐
            │      Extension       │
            └─────────────────────┘
               │                │
    ┌──────────────────┐  ┌──────────────────┐
    │        Ex         │  │      Tensio       │
    │      (Out)        │  │   (To stretch)    │
    └──────────────────┘  └──────────────────┘
```

In other words, the word extension signifies an out of school system of education. Education is an integral part of extension. The basic concept of extension is that it is education. Extension means that type of education which is stretched out to the people in rural areas, beyond the limits of the educational institutions to which the formal type of education is normally confined.

Origin and Growth of Extension Education in India and World

- History of agricultural extension is intimately related to the development in technology. To take advantage of science and technology to the doorsteps of the farmers, agricultural societies were formed. The first society is said to be established in Scotland in 1728 for the spread of knowledge of agriculture through lectures and publications.
- The roots of extension education, however, can be traced back to 1840 when the term University Extension was first used in Britain to take the knowledge to doorsteps of common people.
- Term extension was first used by Voorhees.
- James Stuart, Fellow of Trinity College, Cambridge was considered as the father of University Extension for taking first practical steps and taking lectures to women's associations and working men's clubs in England in 1867-68.
- Cambridge University formally adopted the system in 1873, and was followed by London University in 1876 and Oxford University in 1878to describe teaching activities that extended the work of the institution beyond the campus.
- By the 1880s, the work was being referred to as 'the extension movement'.

- The term extension education was first used by Cambridge University in 1873, with an objective to take educational advantages of the university to ordinary people.
- The Morrill Land-Grant Acts of United States statutes that allowed for the creation of land-grant colleges, including the Morrill Act of 1862 and the Morrill Act of 1890 (the Agricultural College Act of 1890). Land Grant Colleges in the United States of America formally established the Agricultural Extension work by integrating different activities of the colleges.
- In the United States, the Hatch Act of 1887 established a system of agricultural experiment stations in conjunction with each state's land-grant university.
- Smith-Lever Act of 1914 created a system of cooperative extension to be operated by those universities in order to inform people about current developments in agriculture, home economics, and related subjects.
- On the basis of Morrill Land-Grant Acts (1962) first agricultural university Govind Ballabh Pant University of Agriculture and Technology, Pantnagar was established in 1960 in India.
- The University Grants Commission of India has recognized extension as the third dimension, equivalent to teaching and research, in its landmark policy framework of 1977.
- Dr. J. P. Leagans of USA is known as the father of extension, whereas Dr. K. N. Singh is known as father of Extension in the Indian context.

Growth of Agricultural Extension Education as a Discipline in India
- The teaching of extension education at undergraduate level started in the year 1950 at the College of Agriculture, Calcutta University.
- The first post-graduate teaching was launched in 1955, at Bihar Agricultural College, Sabour.
- Next was the post-graduate programme initiated at the College of Nagpur in 1958.
- Creation of a separate Division of Agricultural Extension at Indian Agricultural Research Institute (IARI), New Delhi with assistance from Ford Foundation under the expert advice of legendary Dr. J. Paul Leagans was a landmark event in the history of extension education. The Ph.D. programme in the discipline of extension was first introduced at IARI in 1961.
- Subsequently, Punjab Agricultural University, Ludhiana, followed with Masters and Ph.D. Programmes in Agricultural Extension in 1961.
- At the same time, Division of Dairy Extension was established at National Dairy Research Institute (NDRI), Karnal in May 1961 to undertake extension activities, besides teaching and research in Dairy Extension.

- Section of Division of Agricultural Extension was established at ICAR headquarter in 1971.

Basic definition of Extension Education

Extension education is an applied social science consisting of relevant content derived from physical, biological and social sciences and in its own process synthesized into a body of knowledge, concepts, principles and procedures oriented to provide non-credit out of school education largely for adults.

- Leagans (1971)

Extension Education is a science, which deals with the creation, transmission & application of knowledge designed to bring about planned changes in the behavior-complex of people, with a view to help them live better by learning the ways of improving their vocations, enterprises &institutions

- Reddy (1993)

Extension Education is a science that brings about desirable changes in the behavior of the concerned persons through educational methods, so as to improve their general standard of living with their own efforts. In fact, it deals with the designs & strategies of transfer of technology to the concerned persons. In other words, what is taught to the farmers is not Extension Education, thoughtits knowledge is applied for the effective & efficient communication of various programmes of change.

- Singh (1994)

Extension is education and that its purpose is to change attitude and practices of the people with whom the work is to change.

- Ensminger (1957)

Extension Education is the process of teaching rural people how to live better by learning ways to improve their farm, home and community institutions.

- Leagans (1961)

Extension as an out of school education and services for the members of the farm family and others directly or indirectly engaged in farm production to enable them to adopt improved practices in production, management, conservation and marketing. Several authors defined extension in various ways emphasizing the importance of one or the other aspect of extension.

- National Commission on Agriculture (1976)

Scope of Extension Education

Extension appears to have unlimited scope in situations where there is need for creating awareness amongst the people and changing their behavior by informing and educating them.

Kelsey and Hearne (1967) identified nine areas of programme emphasis, which indicate the scope of agricultural extension.
1.   Efficiency in agricultural production.
2.   Efficiency in marketing, distribution and utilization.
3.   Conservation, development and use of natural resources.
4.   Management on the farm and in the home.
5.   Family living.
6.   Youth development.
7.   Leadership development.
8.   Community development and rural area development.
9.   Public affairs.

The following statements will further amplify the scope of extension.
1.   Extension is fundamentally a system of out-of-school education for adults and youths alike. It is a system where people are motivated through a proper approach to help themselves by applying science in their daily lives, in farming, home making and community living.
2.   Extension is education for all village people.
3.   Extension is bringing about desirable changes in the knowledge, attitudes and skills of people.
4.   Extension is helping people to help themselves.
5.   Extension is working with men and women, boys and girls, to answer their felt needs and wants.
6.   Extension is teaching through "learning by doing" and "seeing is believing".
7.   Extension is working in harmony with the culture of the people.
8.   Extension is a two-way channel; it brings scientific information to village people and it also takes the Problems of the village people to the scientific institutes for solution.
9.   Extension is working together (in groups) to expand the welfare and happiness of the people with their own families, their own villages, their own country and the world.
10. Extension is development of individuals in their day-to-day living, development of their leaders, their society and their world as a whole.

Career opportunities through Extension Education

1. There are government, private and some consultancy services one can opt for job as per his qualification and experience.
2. Among government services there are posts of Assistant Professor in theGovt. Degree Colleges, SAUs, Scientist in the ICAR/CSIR Institutes, DRDO etc.
3. Subject Matter Specialist in Krishi Vigyan Kendras (KVKs) run by selected ICAR institutes, SAUs, State Departments etc.
4. Besides, temporary job as a JRF/SRF, Research Associate/ Project Associates etc. in various ICAR, CSIR and DRDO sponsored research projects under ICAR, CSIR institutes, SAUs etc. are also available.
5. A large number of national and international NGOs engaged in rural development and related R&D activities recruit Extension personnel in different positions depending on the educational qualifications and experiences.
6. Presently, opportunity to work as a counselor or consultant is limited.
7. Nevertheless, enough scope will be there for Extensionists to explore and exploit the opportunities in the area of self-employment in the future.

Extension Education- Process, Objectives and Principles

Extension Educational Process

An effective extension educational programme involves five essential and interrelated steps. This concept of the extension educational process is intended only to clarify the steps necessary in carrying out a planned educational effort. It does not imply that these steps are definitely separate from each other. Experience shows that planning, teaching and evaluation take place continuously, in varying degrees, throughout all phases of extension activities

First step: The first step consists of collection of facts and analysis of the situation. Facts about the people and their enterprises; the economic, social, cultural, physical and technological environment in which they live and work. These may be obtained by appropriate survey and establishing rapport with the people.The responses obtained are to be analyzed with the local people to identify the problems and resources available in the community. For example, after a survey in a community and analysis of the data, the problem was identified as low income of the farm family from their crop production enterprise.

Extension Education is a participative & continuous process
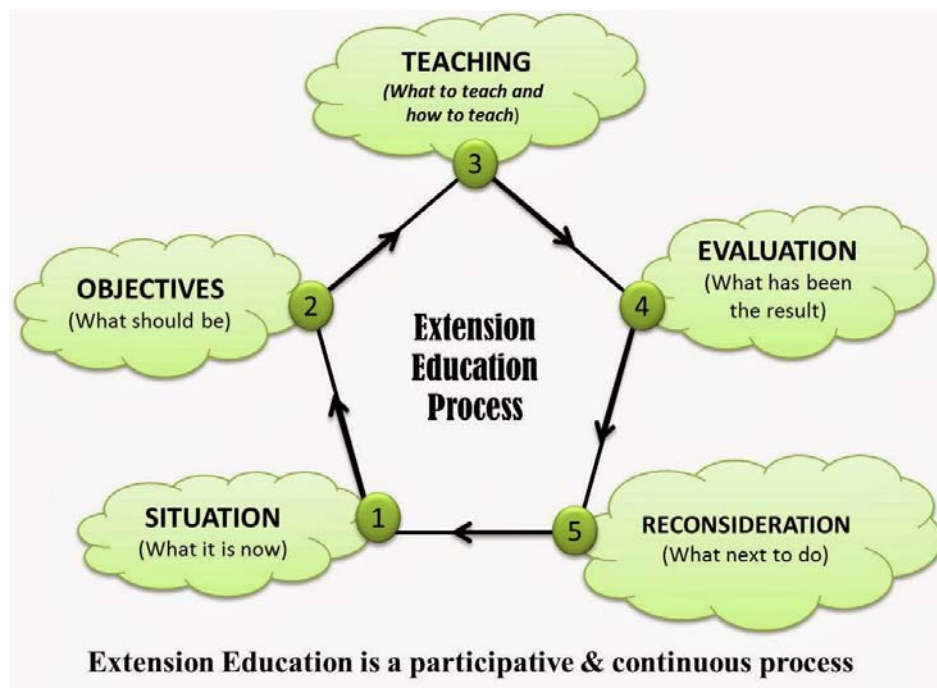
Second step: The next step is deciding on realistic objectives which may be accomplished by the community. A limited number of objectives should be selected by involving the local people. The objectives should be specific and clearly stated, and on

completion should bring satisfaction to the community. Objectives should state the behavioral changes in people as well as economic and social outcomes desired.

In the example, the problem was identified as low income from the crop production enterprise. A deeper probe into the date revealed that low income was due to low yield of crops, which was attributed to the use of local seeds with low yield potential, application of little fertilizer and lack of protection measures. By taking into consideration the capacity and competency of the people in the community and the availability of resources, the objective was 1 3 4 5 2 set up to increase the crop yield by 20 per cent within a certain period of time. It was estimated that the increased yield shall bring increased income, which shall enhance the family welfare.

Third step: The third step is teaching, which involves choosing what should be taught (the content) and how the people should be taught the methods and aids to be used. It requires selecting research findings of economic and practical importance relevant to the community, and selection and combination of appropriate teaching methods and aids.

Based on the problems identified in the particular example, technologies like use of HYV seeds, application of fertilizer and plant protection chemicals were selected as teaching content. Result demonstration, method demonstration, farmers' training and farm publications were chosen as teaching methods, and tape recorder and slides were selected as teaching aids.

Fourth step: The fourth step is evaluating the teaching i.e, determining the extent to which the objectives have been reached. To evaluate the results of an educational programme objectively, it is desirable to conduct a re-survey. The evidence of changed behavior should be collected, which shall not only provide a measure of success, but shall also indicate the deficiencies, if any.

In the example, the re-survey after the fixed period of time, indicated that the crop yield had increased by 10 percent. It, therefore, indicated that there was a gap of 10 per cent in crop yield in comparison to the target (objective) of 20 per cent fixed earlier. The re-survey also indicated that there had been two important deficiencies in carrying out the extension educational program, such as, therewas lack of proper water management and the farmers could not apply the fertilizer and plant protection chemicals as per recommendation due to lack of funds.

Fifth step: The fifth step is re-consideration of the entire extension educational programme on the light of the results of evaluation. The problems identified in the process of evaluation may become the starting point for the next phase of the extension educational programme, unless new problems have developed or new situations have arisen.

After re-consideration of the results of evaluation with the people, the following teaching objectives were again set up.For example, they were, training the farmers on proper watermanagement practices and putting up demonstrations on water management. The people were also advised to contact the banks for obtaining production credit in time to purchase critical inputs. Thus, the continuous process of extension education shall go on, resulting in progress of the people from a less desirable to a more desirable situation.

Philosophy of Extension Education

Philosophy is the pursuit of wisdom, a body of general principles or laws of a field of knowledge. Philosophy of a particular discipline would furnish the principles or guidelines with which to shape or mould the programmes or activities relating to that discipline.

```
                    Philosophy
                        Greek Words

   Philos                        Sophia
       Knowledge                    Manner
```
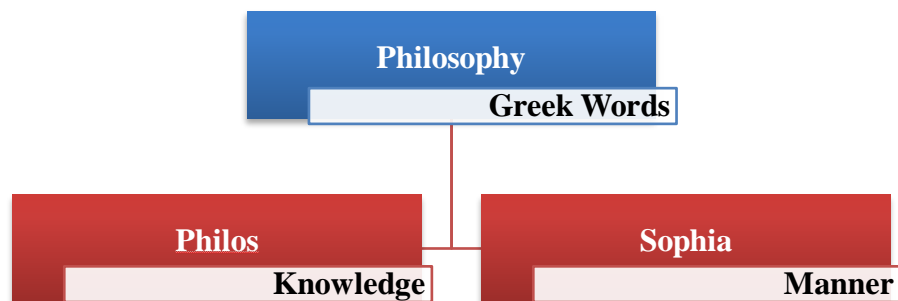
The philosophy of extension work is based on the importance of an individual in the promotion of progress for rural people and for the nation. Extension Educators should work with people to help them, develop themselves and achieve superior well-being.

According to *Kelsey and Hearne (1955)* the basic philosophy of extension education is

"TO TEACH PEOPLE HOW TO THINK, NOT WHAT TO THINK"

Objectives of Extension Education

Objectives are end towards which our efforts are to be directed. More specific objectives of extension education are;

1. To assist people to discover and analyze their problems and identify their felt needs.
2. To develop leadership among people and help them in organizing groups to solve their problems.

3. To disseminate research information of economic practical important in a way people would be work and understand.
4. To assist people in mobilizing and utilizing the resource which they have and which they need from outside.
5. To collect and transmit feedback information for solving management problems.

Principle of Extension Education

A common definition of a Principle is a fundamental truth and a settled rule of action. Principle is a statement of policy to guide decisions and actions in a proper manner.Principle of Extension Education has been given below;

1. *Principle of need and interest*

Extension work must be based on the needs & interests of the people. Always programme must be develop according needs & interests these need differ from individual to individual, from village to village, from block to block, from state to state; therefore, there cannot be one programme for all people.

2. *Principle of grass root level organisation*

A group of rural people in local community should sponsor extension work. They work with local community so that the programme should fit in with the local conditions. The aim of organising the local group is to demonstrate the value of the new practices or programmes so that more & more people would participate.

3. *Principle of cultural difference*

Extension work is based on the cultural background of the people with whom the work is done. Differences in the culture are always being there between extension worker and rural people, success is when extension professionals has to know the level of the knowledge, & the skills of the people, methods & tools used by them, their customs, traditions, beliefs, values, etc. before starting the extension programme.

4. *Principle of cooperation and people's participation*

Extension is a co-operative venture. It is a joint democratic enterprise in which rural people co- operate with their village, block & state officials to pursue a common cause. Ultimately without the cooperation of people the work cannot be successful and desired result cannot be achieved. The first task of extension education is the cooperation of people and their participation in work. Extension helps people to help themselves. Good extension work is directed towards assisting rural families towork out their own problems rather than giving them ready-made solutions. Actual participation &experience of people in these programmes creates self-confidence in them and also they learn more by doing. People should realise that the task of extension education is

11

their own task. Participation in extension work generates confidence among people for the work. It is not essential that all the members of the society should participate but Extension professionals should try for maximum participation of people.

5. *Principle of cultural change*

Extension education starts with what the learner knows, has and thinks. With this in mind and with an attitude of respect towards clients, the extension professionals must seek to discover and understand the limitations, taboo and the cultural values related to each phase of programme so that an acceptable approach could be selected in the locality.

6. *Principle of learning by doing*

According to this principle, farmers are encouraged to learn by doing the work themselves and by participating in it. When a person does a work, he gains practical knowledge and experiences the difficulties. Extension professionals are able to understand the problems and provide proper guidance to the farmers and thus, they are able to receive proper information/feedback.

7. *Principle of trained specialists*

It is very difficult that extension personnel should be knowledgeable about all problems.

Therefore, it is necessary that specialists should impart training to the farmers from time to time.

8. *Principle of adaptability in use of extension teaching methods*

People differ from each other, one group differs from another group and conditions also differ from place to place. An extension programme should be flexible, so that necessary changes can be made whenever needed, to meet the varying conditions. Extension professionals should have knowledge of extension methods so that they can select proper method according to the condition. Teaching methods should be flexible so that they can be properly applied on people according to their age groups, educational background, economic standard and gender. In extension education, two or more methods should be applied according to the principle of adaptability.

9. *Principle of leadership*

Extension work is based on the full utilisation of local leadership. The selection & training of local leaders to enable them to help in carrying out extension work is essential to the success of the programme. People have more faith in local leaders & they should be used to put across a new idea so that it is accepted with the least resistance.

10. *Principle of whole family*

Extension work will have a better chance of success if the extension professionals

have a whole-family approach instead of piecemeal approach or separate & uninterested approach. Extension work is, therefore, for the whole family, i.e. for male, female and children.

11. Principle of evaluation

Extension is based upon the methods of science, and it needs constant evaluation. The effectiveness of the work is measured in terms of the changes brought about in the knowledge, skill, attitude, and adoption behaviour of the people, not merely in terms of achievement of physical targets.

12. Principle of satisfaction

The end-product of the effort of extension teaching is the satisfaction that comes to the farmer and his family members as the result of solving a problem, meeting a need, acquiring a new skill or some other changes in behaviour. Satisfaction is the key to success in extension work. A satisfied stakeholder is the best advertisement.

13. Principle of Indigenous Knowledge

People everywhere have indigenous knowledge system which they have develop through generation of work experience and problem solving in their own specific situation. The indigenous knowledge systems encompass all aspect of life and people considered it essential for their survival.

Extension Programme

The first step in any systematic attempt to promote rural development is to prepare useful programme based on people needs. The development of such programme, require planning which harmonize with the local needs as the people see them and with the national interests with which the country as a whole is concerned, is an important responsibility of extension personnel at all levels- national, state, district, block & village.

Programme planning is the process of making decisions about the direction & intensity of extension-education efforts of extension-service to bring about social, economic & technological changes.

Program planning is a process which involves multiple steps including the identification of a problem, selection of desired outcomes, assessment of available resources, implementation and evaluation of the program. In other words, it is a procedure of working with the people to recognize unsatisfactory situations or problems and to determine possible solutions.

According to *Kelsey and Hearne (1967)* An extension programme is a statement of situation, objective, problems and solutions. It is relatively permanent but requires constant revision.

Leagans (1961) says that an "extension programme" is a set of clearly defined, consciously conceived objectives or ends, derived from an adequate analysis of the situation, which are to be achieved through extension teaching activity'.

Lawrence (1962) says that an "extension programme" is the sum total of all the activities and undertakings of a county extension services. It includes: (i) programme planning process (ii) written programme statement (iii) plan of work (iv) programme execution (v) results and (vi) evaluation.

Programme planning

Programme planning is a decision making process which involves critical analysis of the existing problems and evaluation of available best alternatives to solve theseproblems by cooperative efforts of the people for community growth and development.

Some relevant terms required to understand in programme planning given below:

*Programme:*Programme is a written statement which describes proposed developmental activities, the problems they address, the actions, and resources required.

*Planning:*it is a process which involves studying the past and present in order to forecast the future and in the light of that forecast determining he goal to be achieved.

*Plan:*Plan is schedule of development work outlining different activities in a specific period. It answers the questions like what, why, how, and when as well as by whom and where the work is to be done.

*Aims:*Aims are generalized and broad statement of directions with respect to given activities. eg. The improvement of farmers' economic condition.

*Objectives:*Objectives are expression of ends towards which our efforts are directed. The dictionary meaning of objective is 'something that one's efforts or actions are intended to attain or accomplish, e.g. To increase the yield of rice by 30 percent.

*Goal:*Goal is the distance in any given direction one expects to go during a given period of time e.g. to increase yield of rice by 10 quintals per hectare in the current year.

*Problem:*It refers to a situation, condition, or issue that is yet unresolved and after study people decided need to change it.

*Solution:*Solution is a course of proposed action to change an unsatisfactory condition to one that is more satisfying.

*Project:*it is a specification of work to be done or procedures to be followed in order to accomplish a particular objective.

*Plan:*It is a predetermined course of action.

*Plan of work:*it is an outline of activities so arranged as to enable efficient execution of the programme. The plan of work indicates what, who, how and when the activities will carried out.

*Calendar of Work:*Calendar of work is a plan of activities to be undertaken in a particular time sequence.

Objectives of Programme

The general objective of an extension programme is to influence people to transform their life in better way. The assumption is that there is a need for change and make people aware are of this, if they are not and to develop their needs. Important objectives of having a programme planning as per Kelsey and Hearne (1966) are as follows:

1. To ensure careful consideration of what is to be done and why.
2. To furnish a guide against which to judge all new proposals.
3. To establish objectives toward which progress can be measured and evaluated.
4. To have a means of choosing the important (deep rooted) from incidental (less important) problems; and the permanent from the temporary changes.
5. To develop a common understanding about the means and ends between functionaries and organizations.
6. To ensure continuity during changes of personnel.
7. To help develop leadership.
8. To avoid wastage of time & money and promote efficiency.
9. To justify expenditure and to ensure flow of funds.
10. To have a statement in written form for public use.

Principles of Extension Programme Planning

Extension programmes have the definite purpose of improving rural life through individual, group and community action. Extension programme planning has certain principles, which holds good irrespective of the nature of the clientele, and the enterprises they may be pursuing, viz.:

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 information is to be analyses 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 main objective of programme development is to satisfy the need of people. For this purpose significant objectives pertaining to important needs of the people should be selected and clearly stated. The emphasis will be on what is attainable rather than on what is ideal although one should not lose sight of the ideal.

3. *Extension programmes should fix up priority on the basis of available resources and time.*
Generally, in developed countries rural people have multiple problems but at the same time all problems cannot be taken up for solution because of limitation of the available resources. Therefore, considering this fact priority should be decided in the programme.

4. *Extension programmes should clearly indicate the availability and utilization of resources.*
To make programme practical and workable it is important to clearly indicate the availability of funds, facilities, supplies and the needed personnel and how these resources will be utilized.

5. *Extension programmes should have a general agreement at various levels.*
Programme prepared at various levels such as village, district, state and national levels. The extension programme of any department or level should not be conflict or contradict with the extension programme of the any other department or level.

6. *Extension programmes should involve people at the local level.*
Extension programme are implemented at local level. Therefore, local people should be involved in all stages starting from programme formulation to programme implementation.

7. *Extension programmes should involve relevant institutions and organization.*
Extension programme cannot be implemented in isolation. It requires the support of many institution 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 at least broadly indicate how it will be executed.

9. *Extension programme should provide for evaluation of results and reconsideration of the programme.*

    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 for attainment of objectives within the stipulated time.

10. *Extension programmes should provide for equitable distribution of benefitsamongst the members of the community.*

    In community generally resource full persons benefited more compared to resource poor in any programme. As this creates social disparity and social tension the planning of extension programmes should give adequate emphasis on the weaker section of the community.

Extension Programme Planning Process

The process of extension, as applied to development programmes, involves eight essential step. These steps are intended only to clarify the necessary actions in carrying

out a planned extension programme.The program development process is on-going and continuous. Each educational initiative, workshop or event we carry out modifies the initial situation. As a consequence, any plan of action continues to evolve and change as the situation or context changes.

1. **Collection of facts**

    Sound plans are based on availability of relevant & reliable facts. This includes facts about the village people, physical conditions, existing farm & home practices, trends & outlook. Besides, other facts about customs, traditions, rural

institutions, peoples' organisations operating in the area, etc. should be collected. The tools & techniques for collecting data include systematic observations, a questionnaire, interviews & surveys, existing governmental records, census reports, reports of the Planning Commission, Central Bureau of Statistics, and the past experiences of people.

2. **Analysis of the situation**
    After collecting facts, they are analysed and interpreted to find out the problems & needs of thepeople.

3. **Identification of problems**
    As a result of the analysis of facts, the important gaps between 'what is' & 'what ought to be' are identified and the problems leading to such a situation are located. These gaps represent the people's needs.

4. **Determination of objectives**
    Once the needs & problems of the people have been identified, they are stated in terms of objectives & goals. The objectives represent a forecast of the changes in the behaviour of the people and the situation to be brought about. The objectives may be long-term as well as short-term, and must be stated clearly.

5. **Developing the plan of work**
    In order to achieve the stated objectives & goals, the means & methods attaining each objective are selected; and the action plan, i.e. the calendar of activities is developed. It includes the technical content, who should do what, and the time-limit within the work will be completed. The plan of workmay be seasonal, short-term, annual or long-term.

6. **Execution of the plan of work**
    Once the action plan has been developed, arrangement for supplying the necessary inputs, credits, teaching aids, extension literature etc. has to be made and the specific action has to beinitiated. The execution of the plan of work is to be done through extension methods for stimulating individuals and groups to think, act and participate effectively. People should be involved at every step to ensure the success of the programme.

7. **Evaluation**
    It is done to measure the degree of success of the programme in terms of the objectives & goals set forth. This is basically done to determine the changes in the behaviour of the people as a result of the extension programme. The evaluation is done not only of the physical achievements but also of the methods

& techniques used and of the other steps in the programme planning process, so that the strong & weak points may be identified and necessary changes may be incorporated accordingly.

8. **Reconsideration**

The systematic and periodic evaluation of the programme will reveal the weak and strong points of the programme. Based on these points, the programme is reconsidered and the necessary adjustments & changes are made in order to make it more meaningful & sound.

Programme planning is not the end-product of extension activities, but it is an educational tool for helping people to identify their own problems and make timely & judicious decisions. From the above mentioned cycle, it is clear that the planning of an extension programme comprises a logical series of consecutive steps. The first 4 steps form the programme-phase. The steps 5-7 form the action- phase. The step 8, i.e. reconsideration, joins the 2 phases together, where it leads to the fact-collecting step, thus beginning once more the never ending or continuous process of planning the extension programme.

Extension System in India: Pre Independence Era

Rural development means an improvement of the social, economic and other aspects of life of the rural poor. Rural development encompasses all sectors and sphere of rural life. In its widest sense, it implies development of every aspect of rural life. Rural development is an responsibility of the Government to raise the standard of living of the rural people. There are number of rural development programs were started by the Nationalists and Social reformers. Some of these programs gradually disappeared or some were merged with Government sponsored schemes later. 'This is because of various reasons like lack of encouragement of the Government, lack of financial support, inadequate, in experienced and untrained staff. For the purpose of clarity, Rural Development Programmes classified in two parts:

Stage-I	• Pre-Independence Era (1866-1947)
Stage-II	• Post-Independence Era (1947-1953)

Major Extension Programmes of Pre Independence Era (1866-1947)

- **Scheme of Rural Reconstruction at the Sunderbans in Bengal-1903**
  - Sir Daniel Hamilton
- **Gurgaon project-1920**
  - F.L. Brayne
- **Sriniketan experiment in Bengal-1920**
  - Rabindra Nath Tagore
- **Seva-gram experiment in Wardha-1920**
  - Mahatma Gandhi
- **Marthandam project in Kerala-1928**
  - Spencer Hatch
- **Baroda village reconstruction project-1932**
  - VT Krishnamachari
- **Firka Vikas Yojana in Madras-1946**
  - Government of Madras

1. Gurgaon experiment

In 1920, Mr. Brayne had been appointed on the post of Deputy Commissioner in Gurgaon district and he began this project of rural upliftment in his district, which became famous as "Gurgaon Project." The programme aimed at improving agriculture, education, health and sanitation facilities, co-operation, and social development with greater vigor. He stressed on the dignity of labour, self help and conducted propaganda through films, songs, skits and plays with a view to increase farm yieldsand improving health standards. Although this project got some success yet this scheme also could not survive more because this project was also based upon the sentiments of F.L. Brayne and when he was transferred, gradually this programme also stopped.

2. Sriniketan Project

In 1920, Rabindra Nath Tagore laid the foundation of theSriniketan Institute for Rural Reconstruction with the help of sociologist Shri L.M. Hurst. and formulated aprogramme for the all- round improvement in the Village of hisZamindari with the objective of studying rural problems and ofhelping the Villagers to develop agriculture, improving thelivestock, formation of co-operatives. He believed in self help and mutual help and wanted the village workers to be involved in the life of rural people and work for their welfare. He started this programme in the cluster of **8 Villages** but were not very successful and can only be described as rural welfare works.

The absence of market facilities, professional guidance, lack of co-ordination between the implementing authority and improper incentives for workers made the task more difficult and desired results could not be achieved.

3. Sewagram Experiment in Wardha

4. Marthandam Project

Dr. Spencer Hatch of the **Young Men's Christian Association (YMCA)** set up a Project in 1921 at Marthandam, 25 miles south of Thiruvananthapuram. The purpose of this experiment was to bring about a complete upward development towards a more complete and meaningful life for rural people three folded development -**spirit, mind and body.** To achieve this, they launched five sided programme-spiritual, mental, physical, economic and social developments were also included. The main stress in programme was on the principle that people should not depend on Government for support because when concessions and help in any field are not given, the people develop in them a feeling of self-help and self- reliance.

The objectives of this programme was the YMCA should work in the Villages to eliminate poverty. For the Rural Demonstration Centre at Marthandam had a demonstration farm, prized animals, equipment for the honey industry and other

cottage vocations.

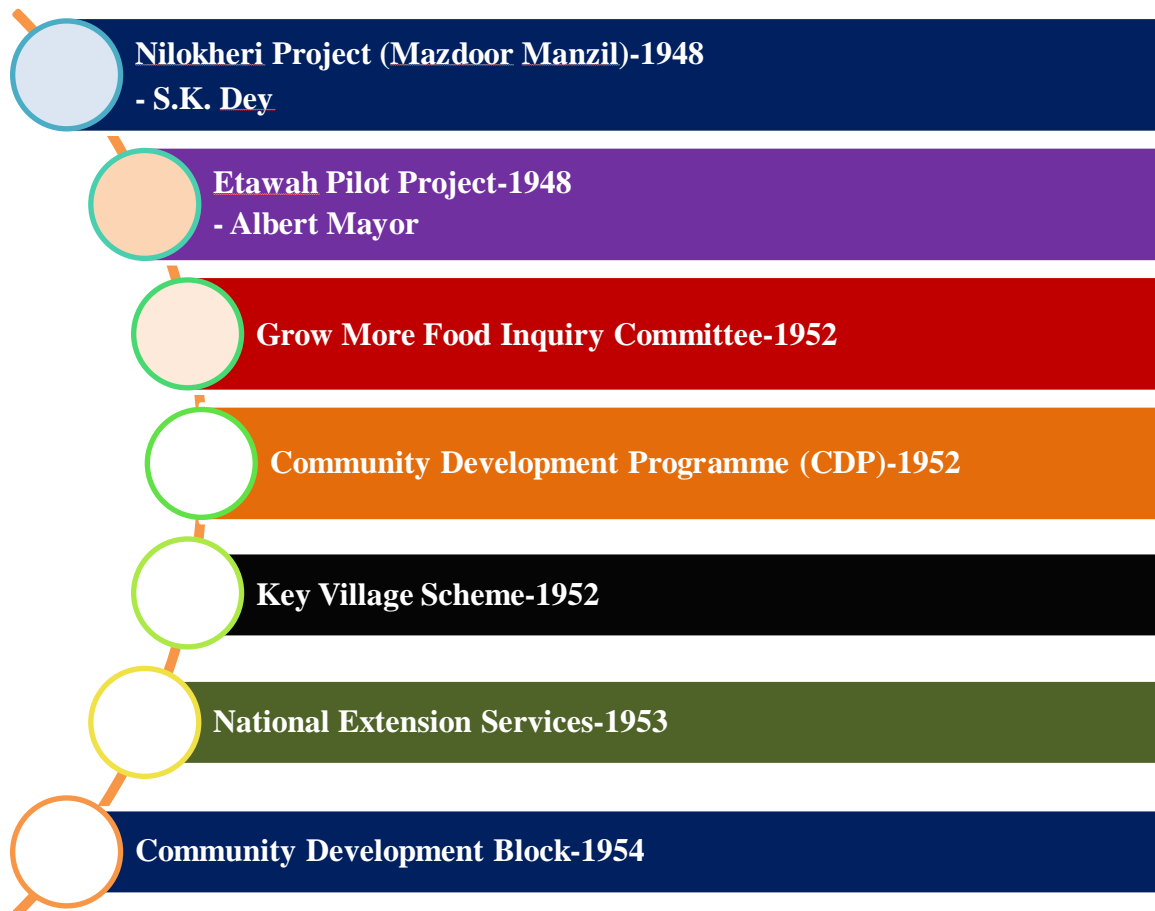5. **Baroda village reconstruction project**

6. **Firka Development scheme**

       The Firka Development scheme of Madras was a Government sponsored Scheme in 1946 this programme aimed at organizing the villagers for a happier, more prosperous and fuller life in whichthe individual villagers had the opportunity to develop both as an individual and as a unit of a well- integrated society. Among Pre-Independence project, this was the biggest project. Selection of Firkas-basedongeneralbackwardnessoftheareaandwherethereispossibilityofinitiatingcottageindustries. The priority areas of work for each Firka included Rural reconstruction facility, Drinking water facility, Sanitation Khadi and other village industries.

For the overall development of the area planning was framed in two categories
- ✓ Short term plans (development of infrastructure, communications)
- ✓ Long term plans (knowledge inputs, attainment of Gandhian ideal)

Major Extension Programmes of Post-Independence Era (1947-1953)

Nilokheri Project (Mazdoor Manzil)-1948 - S.K. Dey

Etawah Pilot Project-1948 - Albert Mayor

Grow More Food Inquiry Committee-1952

Community Development Programme (CDP)-1952

Key Village Scheme-1952

National Extension Services-1953

Community Development Block-1954

1. **Nilokheri Project**

   Nilokheri Project was started by **S.K. Dey** design to rehabilitate about 7000 displaced person (immigrants) from Pakistan after partition. He began this project using 100 acre of swampy land spreading in the midst of Karnal and Kurukshetra. The colony had its own dairy, poultry, piggery, printing press, engineering workshop, bone meal factory all run on cooperative lines. The Scheme was called "**Mazdoor Manzil**" because it was based on the principle of 'he who would not work neither shall he eat.

2. **Etawah Pilot Project**

   In 1947, after Independence, the Government of India prioritised on rural development and how this work should be managed. For this the guidance of an experienced person was needed. The Government of India urged the U.S. government to send Mr. Albert Mayor to India because he had enough experience of rural development programme and was a Rural Sociologist.

   Under the leadership of **Lt. Col. Albert Mayor of USA ,** the office of **Etawah Pilot Project** was established by the U.P Govt. in October 1948 at Mahewa in the Etawah District. Initially 64 villages were selected around Mahewa District for the development. It was also called **Average District Plan** because the project was initiated in the normal environment. This programme named as pilot project means the work is for specific location and further it shows the path. This progrrame was the **fore runner** of CDP (**Community Development Programme**)

Important Extension Programmes of Pre and Post Independence Era

S.No.	Name of Programme	Year	Started by	Place	Objectives
Pre-Independence Programme					
1.	**Sriniketan**	1920	Rabindra Nath Tagore	Sriniketan (Calcutta) West Bengal	✓ To help the rural people inestablishing cottage industry. ✓ To inspire the people to follow new technology. ✓ Development of dairy farming. ✓ To create the feeling ofco-operation
2.	**Gurgaon Project**	1920	F.L Bryne	Gurgaon	✓ To increase crop production ✓ To control extra expenditure ✓ To improve the health. ✓ To develop the feeling ofwomen education
3.	**Marthandam Project**	1921	Dr. Spencer Hatch	Marthandam (Tamil Nadu)	✓ To develop the feeling of self reliance amongst the rural people. ✓ To improve the spirit ofcooperation and self-respect. ✓ To bring the desirable change in the attitude of rural people.
4.	**Firka Development**	1946	Madras Government	Madras (Tamil Nadu)	✓ All-round development of rural people. ✓ To develop the means ofdrinking water and communication. ✓ To develop the committees of panchayat andco-operatives
Post-Independence Programme					
1.	**Etawah Pilot Project**	September 1948	Lt.Col. Albert Mayor	Mahewa District- Etawah (U.P)	✓ To see what degree of production and social improvement can be obtain. ✓ To find out the feeling of cooperation and initative amongst the rural people of anaveragearea.
2.	**Nilokheri Experiment**	July, 1948	S.K.Dey	Kurukshetra (Haryana)	✓ Self-dependence in all the fields of life. ✓ To arrange for professional training and provide occupation for the people on the basis of their experience. ✓ To eliminate the middle-mansystem

Extension Programmes Launched by ICAR / Govt. of India

India has become self-sufficient in agriculture through increasing food production by many folds after green revolution. It was an integrated effort of the policy, research and extension support. Agriculture development in India is very location specific. However, the Union Government play a guiding role in formulating policies to accelerate growth of agricultural sector. The programmes conceived at national level are mainly implemented by the various departments of state government. Indian Council of Agricultural Research (ICAR) is an apex body at the national level that supports research and extension activities to evolve effective Transfer of Technology (TOT) models. The State Agricultural Universities also contemplates to develop extension models suitable to take up transfer of technology besides implementing the models evolved by ICAR system. (K. Narayana Gowda).

There are many agricultural development and extension programmes which were launched by Government of India and ICAR. Some of them are listed below for a glance to understand their objectives and features. Among these programmes some are mentioned as "Programmes for technological Development" like IADP, IAAP, ICDP and HYVP, whereas some are refereed as "Development programmes with Social Justice" viz., MFAL, DPAP, T&V, IRDP, TRYSEM, NREP, DWACRA, NAEP, TMO, JRY, EAS, SFAC and SGSY. Later on various programmes were designed for "Infrastructure Development" like NATP, PURA, NAIP, NREGA and NFSM. Realizing the importance of changing climate and for resource conservation programmes like NICRA and FFS and SHC have been incorporated in the last decade. On a keen observation it is realized that every new programme was designed to fill the deficiency of previous programmes and experiences. Hence these programmes looks like quite related to each other and sometimes overlapping too. However they are capable to address every section of rural community in general and farming community in particular. Programmes introduced in 21st century involves ICT component to ensure faster delivery of information.

IADP: Intensive Agricultural District Programme (1960)

IADP launched in July 1960 in 7 selected districts of various states in its first phase and later extended to another 9 districts more in second phase during 1963-64. This programme focused on increasing productivity and production in those selected district which have high potential to increased yield. It initially covered following districts;(i) West Godavari in AP, (ii) Shahabad in Bihar, (iii) Tanjore in Tamil Nadu, (iv) Raipur in MP, (v) Ludhiana in Punjab; (vi)Pali in Rajasthan; and (vii) Aligarh in UP.

Aim:

    i. Integrated and intensive approach to solve the problems of agricultural production through adoption of package of improved practices.

    ii. The achievements accomplished through this programme were tremendous and it really made a dent into the rural poverty for its eradication through agriculture. This programme was popularly known as Package Programme.

Objectives of the programme

1. To achieve rapid increase in the level of agriculture production through a concentration of financial, technical, extension and administrative resources;
2. To achieve a self-generating breakthrough in productivity and to raise the production potential by stimulating the human and physical process of change
3. To demonstrate the most effective ways of increasing production and thus, to provide lessons for extending such intensified agricultural production programmes to other areas.

IAAP: Intensive Agricultural Area Programme (1964-65)

Philosophy of the IAAP was that "***much greater emphasis should be given to the development of scientific and progressive agriculture in an intensive manner in the areas which have High production potentials***".

Key points of the programme

- The idea was to cover at least 20% of the cultivated area of the country.
- The emphasis was on import crops such as Wheat, Rice, Millets, Cotton, Sugarcane, Potato, Pulses etc.
- The Intensive Agriculture Area programme (IAAP) paved the way for Green Revolution in the country.
- 114 districts were selected in the year 1964 and later extended to 150 districts.

Objective of the programme

- To bring about 20 to 25 per cent of the cultivated area of the country under the intensive agricultural development (Improved version of package programme)

Difference between IADP and IAAP

IADP	IAAP
The main objective of the IADP was to implement the improved farm practices in the selected potential areas to increase the production	The objective of the IAAP was to extend the concept of IADP to other potential areas to cover at least 20-25% of the cultivated area in the country.

This programme was recommended by a team of Food Ford foundation experts	This programme was recommended by the third Five Year Plan mid-term appraisal committee.
The main criteria for selection of the districts was based on areas having assured irrigation facilities minimum natural hazards and well developed co-operatives	The main criteria for selection of districts was based on areas having predominant crops and well developed infrastructure facilities
Twenty-eight districts including Mandya and Raichur were covered under this programme. Number of personnel working in each community block were VLW's -10 AEO - 1 SM's - 2 (SM's were responsible for the whole district)	One hundred and fifty districts including fourteen districts of Karnataka were covered under these programmes.Number of personnel working in each community block were VLW's -10 AEO - 1 SM's - 2 (similar to IADP)

All-India Coordinated Project on National Demonstration (1964)

National Demonstration is a programme based on the concept of increasing the productivity per unit area and time by using proven agricultural technology. ICAR's National demonstration programme on major food crops was launched in 1964. It covered 100 districts mainly through the State Agricultural Universities.

Objective

The main objective of this programmes are
1. To demonstrate convincingly to farmers the production potentialities of a unit area of the land by using high yielding varieties of crops and adopting a multiple cropping programme with full package of practices such as balanced use of fertilisers and effective water management techniques.
2. To demonstrate use of implement for different operations and use of soil testing laboratories for use of balanced fertiliser doses.
3. To fully exploit these demonstrations for the purpose of training farmers in improved cultivation practices and to use them as recognised and effective audio visual aids for the flow of latest research technology and results to farmers.
4. To provide research workers a first-hand knowledge of the problems faced by farmers in growing high yielding varieties and to identify the constraints limiting the crop production.
5. To minimize the time lag between the research generated and its application in

field.

6. To influence the extension system of the state Departments of Agriculture and voluntary organizations in the country by demonstrating the yieldgaps and pointing out operationalconstraints.
7. To determine the income and employment generation potentialities of the crops/subjects under demonstration, and educate the farmers and extension agents about them.

The performance of high yielding varieties of cereals was very promising but its full production potential was not demonstrated on a large scale to the farmers. Higher yields obtained on the research station did not impress the farmers. Who preferred to see the performance of these varieties on their own farms. Moreover, the scientists were looking for scientific feedback from field which would ultimately help them further refine the technology. At this juncture in 1965-66 the ministry of Agriculture, Government of India initiated a nationwide programme in which demonstrations are connected on farmer's fields. This was the beginning of National Demonstration project (NDP). Demonstrations under this project were carried out mainly by the scientists of the SAU's and ICAR institutes in neighbouring villages. The scientists were required to demonstrate the potentiality of new seeds and package of practice on an area varying from 0.4 ha to 1.0 ha on farmers field single crop demonstration are carried out for crops like wheat, paddy, sorghum, pearl millet and maize.

Procedure to conduct national demonstration
• A demonstration has to be conducted on 0.4 ha land for full 1 year. Yield target of 9 tonnes of food grains for two crop per year per ha had been fixed. If achieved the difference in the yield levels show the gap between how much is produced and how much can be produced and how much can be produced by the farmers. A sum of Rs. 500 per year for three crops (Multiple demonstrations) was given for meeting the cost of critical inputs. For the first crop the amount was Rs. 200 and for subsequent crops Rs. 150 each has been embarked.
• The NDP was implemented at district level by a team of 4 subject matter specialists. Who were entrusted with the responsibilities to conduct the demonstration on farmers field. They also organise field days at the time when important field operations were performed. Thus a large number of farmers got educated about new technology demonstrated on farmers field.
• In all 25 demonstrations per season were laid on the farmers field in each district. Very intensive cropping system techniques of soil and water management including use of machinery and plant protection were demonstrated under National Demonstration Project (NDP). Thus these demonstration served as pace settlers which are the first demonstrations and are to be emulated by local extension workers and farmers.

High Yielding Variety Programme (HYVP-1966)

The HYVP was launched in 1966,which helped the country in attaining self-sufficiency in food.

Keypoints

- This programme combined with the application of high analysis and balanced fertilizer, irrigation, plant protection, improved implements etc, which made a **'green revolution'** possible in the country.
- The pervasive influence of high yielding technology spread to other areas of farm production such as animal production, such as animal production, fishery, sericulture, social forestry etc.
- *Punjab, Haryana and Western parts of UP* were initially selected for the phased launching of this strategy.
- The cultivation of HYV since 1966-67 had resulted in a substantial increase in food-grains production. Wheat production was doubled. Rice production also had a substantial increase, though not as much as in the case of wheat.
- The target of coverage of 2.5 crore hectares of area under HYVs of cereals and millets under fourth five-year plan was exceeded. The coverage was more than four crore hectares.

Objectives

- ➢ To attain attaining self-sufficiency in food through high yielding varieties combined with the application of high analysis and balanced fertilizer, irrigation, plant protection, improved implements etc.

Operational Research Project (1974-75)

  i. To test, adopt and demonstrate the new agricultural technology on farmer's fields in a whole village orin a cluster of little contiguous villages/watershed area.
 ii. To determine the profitability of the new technologies and their pace of spread among the farmers.
iii. To identify the constraints both technological, as well as socio- economic that are barrier to rapid change.
 iv. To demonstrate group action as a method of popularizing the modern technologies at a faster rate.

Krishi Vigyan Kendra (Farm Science Centre, 1974)

Krishi Vigyan Kendra is a noble concept developed and funded by Indian Council of Agricultural Research (ICAR), New Delhi. KVKs are working under the administrative control of ICAR, SAUs, Central Universities and NGOs. The basic concept of functioning of KVKs is transfer of technology from laboratory to farmer's field (under lab to land programme) with respect to important fields of agriculture, viz. Crop

Production, Plant Protection, Horticulture, Livestock Production and Management, Farm Engineering, Soil Water Conservation, Home Science and allied fields. They are directly working for rural development through transfer of technology. New/improved technologies developed by ICAR and SAUs are transferred to the farmers field through On Farm Trials (OFTs), Frontline Demonstrations (FLDs), Trainings and Extension activities such as Kisan gosthies, Farmer fairs, etc. Nowadays agriculture is not only farmers' job; it is growing as agri-business for both rural as well as urban areas. In the present scenario farmers are educated, intelligent, attentive, skilled and eager to learn new things that may help in their working. They are using most modern technologies for better production and marketing of their produce. Hence, agriculture is flourishing as agri-business and it has a better potential to uplift the socio-economic status of rural community. In this way, KVKs are playing an important role in agricultural and rural development through all the abovementioned activities.

Evolution of KVKS in India

Based on the recommendations of the Education Commission (1964-66), review by the Planning Commission, Inter–Ministerial Committee and other further recommendation by the committee headed by Dr. Mohan Singh Mehta appointed by ICAR in 1973, the idea of establishment of Farm Science Centre (Krishi Vigyan Kendra) was evolved.

Objectives of KVKs

The general objectives of all the activities undertaken by KVKs are:
i.   To demonstrate the new improved technology to the farmers as well as to the extension agencies directly in the farmers' field with their active participation.
ii. To identify the important problems of that area as per the need of the farmers and prioritization of the identified problems as per their importance.
iii. To collect feedback from the farmers and extension agencies and to communicate these massages to research scientists for modification of technology.
iv. To impart training on different topics to different group of the villagers.
v.   To provide new and important information to the extension agencies and NGOs for wider circulation in the locality to improve their economic condition.
vi. To prepare different extension models and verify these models in the farmers field with their participation to create confidence among them.

To achieve all the abovementioned objectives KVK undertake following types of activities in the adopted villages:
a.   Farm Advisory Service
b.   Training programme for different categories of people.
c.   Training programme for the extension functionaries.
d.   Front Line Demonstration (FLDs)
e.   On Farm Testing (OFTs).

T & V System

The 'Training and Visit System' of new agricultural extension was initially developed by *Daniel Benor*. This programme was first used extensively by the World Bank in India in early 1970s, following a field trail in a project in *Turkey*. Its results were so encouraging that it was adopted in Bangladesh, Indonesia, Nepal, Pakistan, and Sri Lanka. The main aim of this programme was to impart technical knowledge to farmers with special attention to contact farmers and guide them in the field operation to adopt more improved practices.

To ensure delivery of expert know-how to every field every week or fortnight. Transfer was ensured in two stages through-

1. Training: *For transfer of know-how from subject matter specialists to extension worker*
2. Visits: *For transfer of know-how obtained at the training from extension worker to the farmer*

Objectives

1. Coordinate research, training and extension activities effectively.
2. To make research more effective by catering to the local needs and situation.
3. To evolve an intensive training programme on a systematic basis for extension workers and farmers to ensure effective supervision and technical support to VEWs.

T& V System: Organisational Structure

The entire organization was based on total number of farm families which a village extension worker (VEO or VLW) could reasonably cover.

Coverage of various extension personnel

Level	Extension personnel	Coverage
Field	Village Extension Worker (VEW)	800-1200 farm families
Block	Agricultural Extension Officer (AEO)	8 VEWs
Sub-Divisional	Sub-Divisional Extension Officer(SDEO)	5-8 AEOs
District	District Extension Officer (DEO)	4-8 SDEO in district

T & V System: Key Features

1. **Professionalism:** Each extension agent is fully and continuously trained to handle one's particular responsibilities in a professional manner.
2. **Single line of command:** The extension service must be under a single line of technical and administrative command within the Ministry/Department of Agriculture.
3. **Concentration of effort:** All extension staff works only on agricultural

extension. In training sessions, attention is concentrated on important major points.

4. **Time –bound work:** Messaged and skills to be taught to farmers in a regular and timely fashion. The village extension worker (VEW) must visit the farmers regularly on a fixed day i.e. once in each fortnight.

5. **Field and farmer orientation:** The contact with the farmers must be on a regular basis, on a schedule known to farmers, and with a large number of farmers representing all major farming and socio-economic types.

6. **Regular and continuous training:** Fortnightly training and monthly workshops are the key means of bringing actual farmer's problems to the attention of research, of identifying research findings of immediate relevance to farmers and of developing production recommendations that fit specific local conditions.

7. **Linkages with research:** Seasonal and monthly workshops, joint field visits, training of extension staff and formulation of production recommendations are some of the means by which linkages with research are maintained.

Lab to Land Programme (1979)

The Lab to Land Programme (LLP) was launched by the ICAR in 1979 as a part of its Golden Jubilee celebration. The overall objective of the programme was to improve the economic condition of the small and marginal farmers and landless agricultural labourers, particularly scheduled castes and scheduled tribes, by transfer of improved technology developed by the agricultural universities, research institutes etc. The specific objectives of the Lab to Land programme, according to Prasad, Choudhary and Nayar (1987) were-

1. Study and understand the background and resources of the selected farmers and landless agricultural labourers. To introduce low-cost relevant agricultural and allied technologies on their farms and homes for increasing their employment, production and income.

2. Assist the farmers to develop feasible farm plans keeping in view the availability of technologies, needs and resources of the farmers and the resources which could be made available from external sources and agencies.

3. Guide and help the farmers in adopting improved technologies as per their farm plans and demonstrate to them the economic viability of those technologies as well as methods of cultivation and farm management.

4. Organize training programmes and other extension activities, in relation to their adopted practices and prepare them for active participation in agricultural development programmes of the state.

5. Make the farmers aware of the various opportunities and agencies which they could utilize to their economic advantage.

6. Develop functional relations and linkages with the scientists and institutions for future guidance, advisory services and help.

7. Utilize this project as a feedback mechanism for the agricultural scientists and extension functionaries.

National Agricultural Technology Project (1998)

The National Agricultural Technology Project (NATP) was a dynamic instrument of introducing major changes in the Agricultural Research and Extension systems of the country. The project was initiated by Ministry of Agriculture, Govt. of India with the financial assistance of World Bank. Implemented with the assistance of MANAGE in 28 districts covering 7 states, viz. **Andhra Pradesh, Bihar, Jharkhand, Himachal Pradesh, Maharashtra, Orissa and Punjab** over a period of 5 years **(1998-2003).**

Components of NATP

    i. Organisation and Management System
    ii. Agricultural Research
    iii. Innovations in Technology Dissemination

The different Project Implementing Agencies (PIAs) involved in implementation of the ITD component of NATP are:

1. Directorate of Extension (DOE)
2. National Institute of Agricultural Extension Management (MANAGE)
3. NATP cell at State Head Quarters
4. State Agricultural Management and Extension Training Institute (SAMETI)
5. District Level Agricultural Technology Management Agencies (ATMAs)

NATP-ITD Implementation

The Extension component termed as "Innovations in Technology Dissemination"(ITD) envisages an integrated extension delivery at district level and is being pilot tested in **seven participating states**, viz. **Andhra Pradesh, Bihar, Jharkhand, Himachal Pradesh, Maharashtra, Orissa, Punjab.**

Purpose:

To test new approaches to technology transfer, new organizational arrangements, and operational procedures.

Goals:

- To decentralize decision making to the district level through the creation of **Agricultural Technology Management Agency (ATMA)** as a registered society
- To increase farmer input into programme planning and resource allocation especially at the block level and increase accountability to stakeholders
- To increase programme coordination and integration.

Agriculture Technology Management Agency (ATMA)

- The ATMA was established as a registered society at district level
- Responsible for all the technology dissemination activities at the district level
- Linkage with all the line departments, research organizations, non-governmental

organizations and agencies associated with agricultural development in the district

- Research and Extension units within the project districts such as ZRS or substations, KVKs and the key line Departments of Agriculture, Animal Husbandry, Horticulture and Fisheries etc. would become constituent members or Key stake holders of ATMA.***This Scheme was approved on 29th March, 2005***

Objectives
1. To strengthen research – extension – farmer linkages
2. To provide an effective mechanism for co-ordination and management of activities of different agencies involved in technology adaption / validation and dissemination at the district level and below.
3. To increase the quality and type of technologies being disseminated.
4. To move towards shared ownership of the agricultural technology system by key shareholders.
5. To develop new partnerships with the private institutions including NGOs.
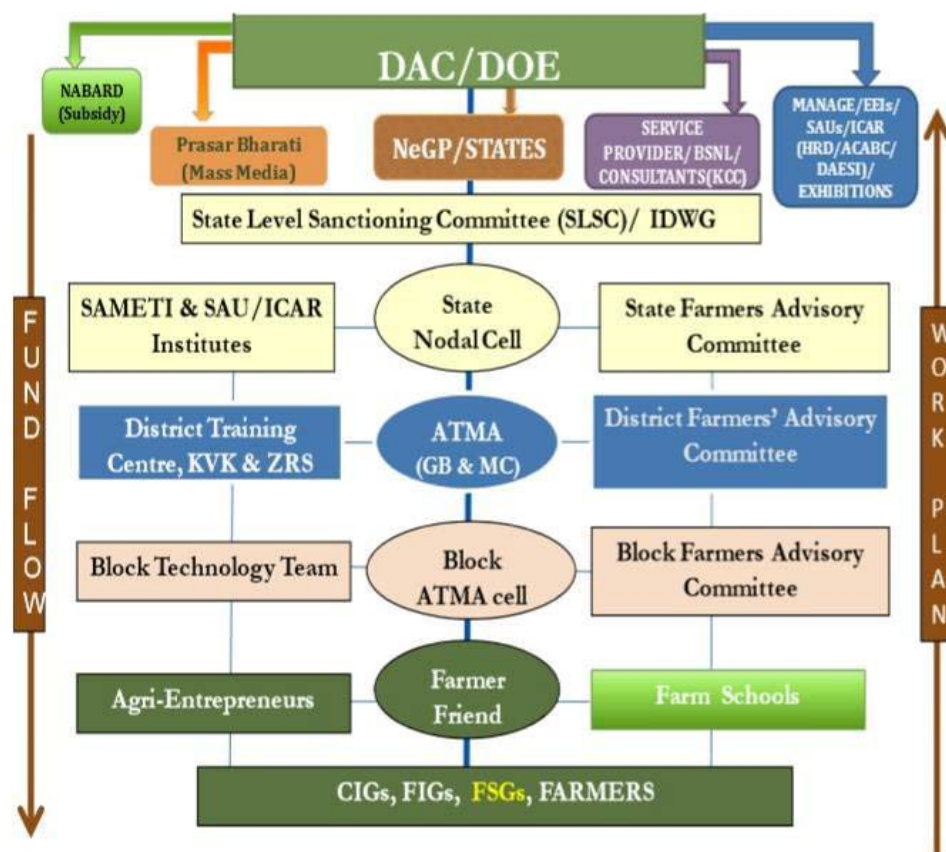
Organization structure of ATMA model

Development Programmes Launched by ICAR / Govt. of India

National Rural Employment Programme (1977)	
Rural Poor	• To provide productive assets to the rural poor to enable them to generate additional or incremental income out of the provided assets and also leave a surplus to repay the loan. • To provide employment to the rural poor by creating durable community assets or undertaking other workprogramme both during busy and lean period. • To provide basic infrastructural facilities like clean drinking water, medical facilities, education, electrification, rural roads etc. • To provide clinical and other types of guidance and support to the unemployed to make them the potential entrepreneurs forself-employment..
Training of Rural Youth for Self- Employment (1979)	
Rural Youth	• To provide technical skill to the rural youth from the families below poverty line to enable them to take up self employment in the broad fields of agriculture and allied activities, industries, services and business enterprises.
Integrated Rural Development Programme (1980)	
BPLFamilies	• The objective of Integrated Rural Development Program is to help families who live below the poverty line to enhance their state of living and to empower the poor by helping them develop at every level. • The program's objectives are met by providing productive assets and inputs to its target groups. • The assets, which could be in the primary, secondary or tertiary sector are provided as financial assistance to these families in the form of government subsidies as well as loans or credit from financial institutions.
Rural Landless Employment Guarantee Programme (1983)	
Landless rural poor	• Generating gainful employment Creating proactive assetsinrural areas. • Improving the overall quality of rurallife.
Jawahar Rozgar Yojana (NREP + RLEGP) (1989)	
Rural Poor	• Generation of additional gainful employment for the employed

Families	and underemployed persons in the rural areas.
National Agriculture Extension Project (1982-83)	
Farmers	• To strengthen the reorganized agricultural extension system. • To conduct district level bimonthly technical workshops. • To conduct district level diagnostic survey. • To develop literature on crops and agricultural enterprises suitable for the district. • To organize farmers interaction sessions.
Watershed Development Programme (1994-95)	
Human as well asanimals	• To develop wastelands or degraded lands, drought-prone and desert areas on watershed basis, keeping in view the capability of land, site conditions and local needs. • To promote the overall economic development and improving the socio- economic condition of the resource poor and disadvantaged sections inhabiting theprogramme areas. • To mitigate the adverse effects of extreme climatic conditions such as drought and desertification on crops, human and livestock population for their overall improvement.
National Agricultural Innovation Project (2006)	
All stakeholders in agriculture	• To alleviate the accelerated and sustainable transformation of Indian agriculture in support of poverty easing and income generation *via* cooperative development and application of agricultural innovations by the public organizations in partnership with farmers groups,theprivatesectorandotherstakeholders.
National Innovations on Climate Resilient Agriculture (NICRA) (2011)	
Farmers	• To enhance the resilience of Indian agriculture covering crops, livestock and fisheries to climatic variability and climate change through development and application of improved production and risk management technologies. • To demonstrate site specific technology packages on farmers' fields for adapting to current climate risks. • To enhance the capacity of scientists and other stakeholders in climate resilientagricultural research and its application.
Attracting and Retaining Youth in Agriculture (2015)	
Rural youth	• To attract and empower the Youth in Rural Areas to take up various Agriculture, allied and service sector enterprises for sustainable incomeand gainful employment in selected districts. • To enable the Farm Youth to establish network groups to take up resource and capital intensive activities like processing, value

	addition and marketing.
	• To demonstrate functional linkage with different institutions and stakeholders for convergence of opportunities available under various schemes/program forsustainabledevelopment of youth.

Farmers FIRST (Farm, Innovations, Resources, Science and Technology) Programme (2016)

Farmers	• To enhance farmer-scientist interface, enrich knowledge and facilitate continued feedback.
	• To identify and integrate economically viable and socially compatible technological options as adoptable models for different agro-ecological situations.
	• To study performance of technologies and perception of the farmers about agriculture as a profession in the rural settings. To develop modules for farm women to address drudgery reduction, income enhancement and livelihood security.
	• To build network of linkages of organizations around the farm households for improving access to information, technology, input and market.
	• To institutionalize Farmer FIRST process.

Mera Gaon Mera Gaurav (2015)

Farmers	• To ensure that farmers benefit from best farm practices by providing required information, knowledge and advisories on regular basis byadopting villages.
	• To create awareness among farmers about the organisations and their programmes and schemes as well as government policies related to the farming sector.
	• To imbibe a sense of ownership among the agricultural scientists of the country.

Soil Health Card (2015)

All farmers	• To provide a basis to address nutrient deficiencies in fertilization practices.
	• To strengthen functioning of Soil Testing Laboratories (STLs) through capacity building.
	• To diagnose soil fertility related constraints with standardized procedures.
	• To develop and promote soil test based nutrient management.
	• To disseminate soil testing results through SMSs

New Trends in Agriculture Extension
Private Extension

Privatization of Extension or Agriculture Extension Services

Privatization refers to a process by which the government reduces its role in an activity and encourages private sector to take up these roles. In privatized extension funding and delivery of extension services is done by private individual or organization for which they charge fee or free depending on the model of business activity.

> **Concept and Definition**
> - ❖ ***Vanden Ban and Hawkins (1996)*** state that in private sector extension, farmers are expected to share the responsibility for the service and pay all or part of the cost.
> - ❖ ***Saravanan and Shivalinge Gowda (1999)*** operationalized Privatization as follows: "Privatization of extension service refers to the services rendered in the area of agriculture and allied aspects by extension personnel working in private agencies or organisations for which farmers are expected to pay a fee (or free) and it can be viewed as supplementary or alternative to public extension services".

These concepts about the privatization emphasize three aspects:
- It involves extension personnel from private agency/ organization.
- Clients are expected to pay the service fee.
- Act as supplementary or alternative to public extension service.

Through the process of privatization, extension effectiveness is expected to improve by:
- reorienting public sector extension with limited and well-focused functions,
- more number of extension providers (institutional pluralism) resulting from active encouragement by the public sector to initiate, operate and expand.
- more private participation leading to the availability of specialized services hitherto not available from the public system
- user contributions to extension leading to improved financial sustainability,
- support and control by clients leading to client orientation

Why Private Extension?

Advantages of Private Extension System

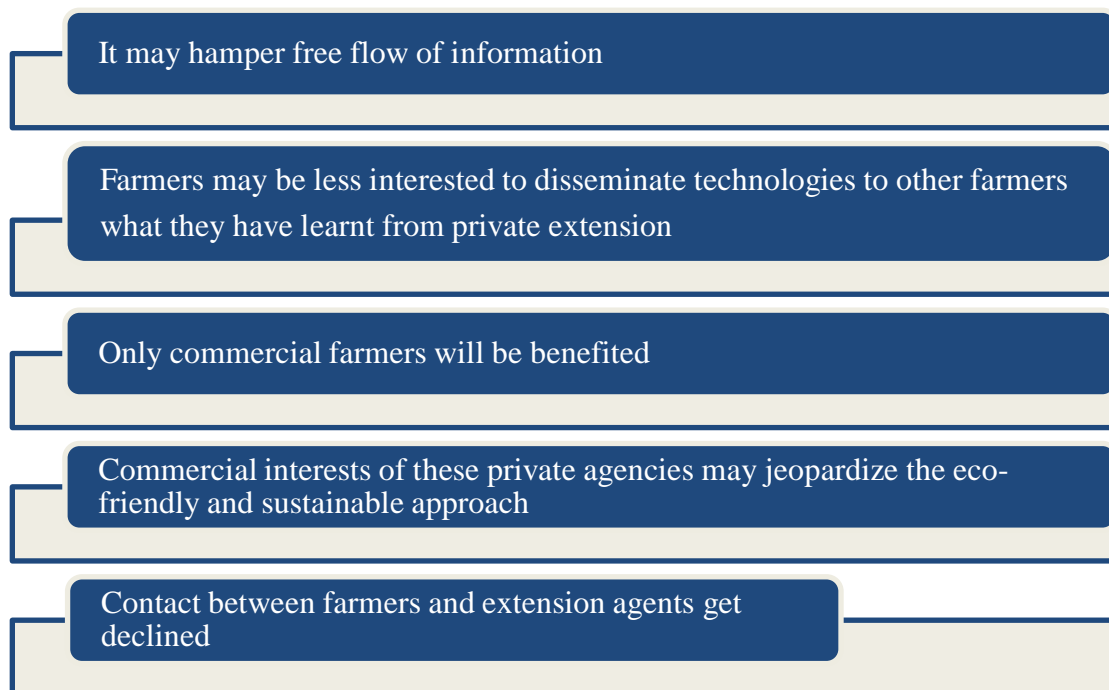Reduces the economic burden of government

Increases the efficiency of extension services

Increases the accountability of extension agents

Government can have maximum control over private extension

Support and control by clients leading to client orientation

Disadvantages of Private Extension System

It may hamper free flow of information

Farmers may be less interested to disseminate technologies to other farmers what they have learnt from private extension

Only commercial farmers will be benefited

Commercial interests of these private agencies may jeopardize the eco-friendly and sustainable approach

Contact between farmers and extension agents get declined

Elements of Private Extension

Objectives	•Profit Maximization •Increasing the efficiency
Target Group	•Only those who can pay •More committed and Highly careful •Actively participating
Mandates	•**Technologies:** Location specific, demand driven, timely, profitable •**Input supply:** quality, timely and adequate
Funding	•Clients contribution •Development agencies
Extension Personnel	•Accountable to farmers •Highly motivated •Highly professional
Extension Method	•Personal communication •Participatory approach •Less use of group and mass contact

New Trends in Agriculture Extension
Cyber Extension/ e-Extension

Cyber

According to Oxford dictionary the word Cyber means "relating to Information technology, the Internet and virtual reality, the Cyber space. The word has its origin from cybernetics.

Cyber space

The cyber space is the imaginary or virtual space of computer connected with each other on networks, across the globe. These computers can access information in form of text, graphics, audio, video and animation files. Software tools on network provide facilities to interactively access the information from connected services. The cyber space thus can be defined as the imaginary space behind the interconnected telecommunications and computer networks, the virtual world.

Extension

Extension stands for "the action or process of enlarging or extending something". It could be extension of area, time or space.

E-extension and cyber extension are more or less synonymous and can be used interchangeably. Cyber extension and e-extension are extension approaches; whereas ICT is the tools by which various services are delivered to the clientele fulfilling the objectives of e-extension/ cyber extension (Mondal, 2019).

Cyber extension

According to Sharma (2005) Cyber extension can be defined as the "Extension over cyber space". Cyber extension means "using the power of online networks, computer communications and digital interactive multimedia to facilitate dissemination of agricultural technology". Cyber extension includes effective use of information and communication technology, national and international information networks, internet, expert system, multimedia learning systems and computer based training systems to improve information access to the farmers, extension workers, research scientists and extension managers.

Cyber agricultural extension is an agricultural information exchange mechanism over cyber space, the imaginary space behind the interconnected computer networks through telecommunication means. It utilizes the power of networks, computer communications and interactive multimedia to facilitate information sharing
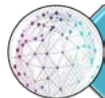
mechanism (Wijekoon, 2003).

Information provided through Cyber extension

Cyber extension can provide large amount of information to farmers. Some of those as mentioned by Sharma are:

1. *Weather:* Daily information of maximum and minimum temperature, day length, direction and speed of wind, rain fall, relative humidity and weather forecasting.
2. *Alert:* Information regarding type of disaster, sudden change in weather, outbreak of diseases and insects etc.
3. *Insurance:* Detail information about insurance of farmers, his crop, animal and agricultural assets like tractors, implements and tools etc.
4. *General awareness:* Information about vaccination, cleanliness, health, family planning and nutrition.
5. *Rural Finance:* Information about micro finance and subsidy etc.
6. *Education:* Detail information about farmers training and educational knowledge of his children about professional and non-professional institution.
7. *Animal Science:* The detail regarding the local animal and well known diseases, better breeds, balanced feed, shed management, health etc.

Advantages of Cyber Extension

1. Information can be provided quickly to farmers.
2. Round the clock service to farmers.
3. Information can be accessed from any place on the earth.
4. Helpful in enhancing the communication efficiency.
5. Preserves the quality of message.
6. Experts can be contacted directly.
7. Per unit cost is less as compared to traditional system of extension.

Limitation of cyber extension

1. Lack of reliable telecom infrastructure in rural areas.
2. Erratic or no power supply.
3. Lack of ICT trained manpower (willing to serve) in rural areas.
4. Lack of content (locally relevant and in local language).
5. Low purchasing power of rural people.
6. Lack of holistic approach.
7. Issues of sustainability.

IT and ICT

IT (Information Technology) refers to computer based technology and telecommunications. IT refers to an entire industry that uses computers, networking, software and other equipment to manage information. Generally, IT departments are responsible for storing, processing, transmitting, retrieving and protecting digital information of the company.

Cyber Extension: IT Vs ICT

IT	ICT
Computer based technology and telecommunication	Integration of IT with mediation broadcasting technologies
Computers, networking, software and other equipments	Audio-video processing and transmission
	Computer Technologies; Communication Technology; Information Management Technologies
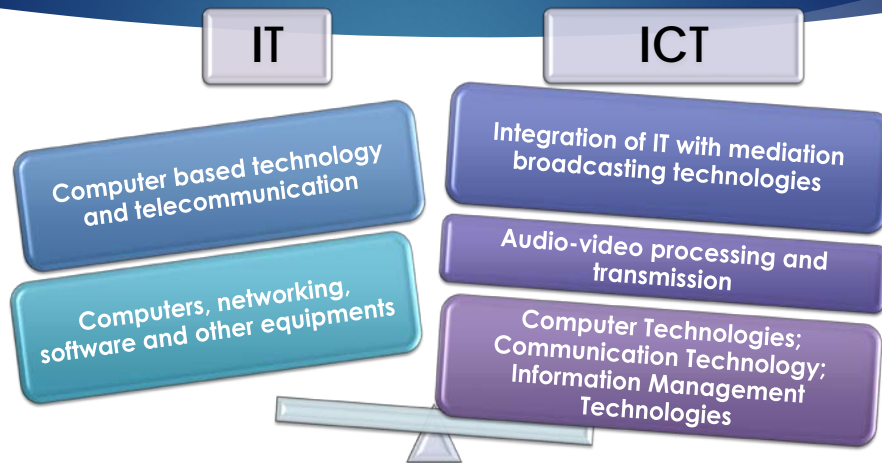
ICT (Information Communications Technology) can be seen as an integration of IT with mediation broadcasting technologies, audio/ video processing and transmission and telephony. Therefore, ICT can be seen as an extended acronym for IT.

New Trends in Agriculture Extension
Farmer-Led Extension

Concept of Farmer-Led Extension

The farmer led extension approach gives farmers the opportunity to share their experiences and practices through a method demo with fellow farmers in the area. It was noted that farmers who were successful in their farming venture have established credibility among their peers. In selecting the farmer extensionist, the primary consideration is- he should be an innovative farmer, active and hardworking, honest and credible interested in learning, accepted and committed to the community, and most importantly interested to share his knowledge and skills. Likewise a farmer extensionist must have conducted a techno demo trial and field day, preferably attended the FFS. He must also have the capacity and willingness to finance the cost of technology.

Farmer-to-Farmer extension is defined here as "the provision of training by farmers to farmers, often through the creation of a structure of farmer promoters and farmer trainers.

There are 5 types of farmers-led extension:
1. Farmers to farmer
2. Farmer field school
3. The problem census
4. Problem solving approach
5. NGO government collaboration

Paradigm shift from production-led to farmers-led extension system (Kokate *et al.*, 2009)

Components	Production-led	Farmers-led
Purpose/ Objective	Transfer ofproduction technologies	Capacity building (especially farmers extensionist), create para-professional technologies extensionworkers, creatingor strengtheninglocal institution
Goal	Food self-sufficiency	Livelihood security including food, nutrition, employment to alleviate poverty Sustainability and conserving bio-diversity
Approach	Top-down,commodity	Participatory, bottom-up and demand

	and supply driven	driven
Actors	Mostly public institutions	Pluralistic with public, private, non-government and farmers organizations as a partner rather than competitors
Mode	Mostlyinterpersonal/ individual approach	Integration of clients oriented on-farm participatory/ experiential learning methods supported by ICTs and media
Role of extension agents	Limited to delivery mode and feedback to research system	Facilitation of learning, building overall capacity of farmers and encouraging farmers experimentation
Linkages/ liaison	Research-Extension-Farmers	Research-Extension-Farmers Organizations (FIGs, CIGs, SHGs)
Emphasis	Information management, Production "Seed to Seed"	Knowledge management and sharing
Nature of technology	Input intensive, crop based andgeneral recommendations as per agro-climatic zone, fixedpackage of information	Knowledge intensive, broad based, farming system perspective and blending with ITKs
Critical areas	Improvement, production and protection	Decision support system, integrated farming system approach, natural resource management, client group formationand communityempowerment
Critical inputs	Money and material	Access to information, building human and social capital
Accountability	Mostly government	To farmers rather than donors

Market Led Extension

➢ **Globalization of the market,** farmers need to transform themselves from mere producers-sellers in the domestic market to producers cum sellers in a wider market sense to best realize the returns on their investments, risks and efforts.

➢ **Market linkage** is a must for agriculture.

➢ **Market is congregation** of prospective buyers and sellers with a common motive of trading a particular commodity.

What to produce?

When to produce?

When and where to sell?

How much to produce?

At what price and to whom to sell?

Market led extension is an approach, through which extension system will reach the clientele on an end to end basis beginning from **package of practices** for production to **selling of produce** at the consumers' door so that the farmers can get *remunerative price* for their produces.

PARADIGM SHIFT

➢ Productivity to Profitability

➢ Subsistence to commercial Agriculture

➢ Commodity oriented to farming systems orientation

➢ Local Market to Export market

➢ Mono cropping to crop diversity

➢ Exploitative Agriculture -Sustainable Agriculture

Production Led Extension

Supply Driven

Demand Driven

Market Led Extension

Basics of market led extension
- Market analysis
- Market intelligence
- Use of technology

Aspects of market led extension
- Community mobilization
- Forming CIGs
- Forward and backward linkages
- Improvement of effectiveness of existing markets
- Improvement of efficiencies of marketing channels

Paradigm shift from Production-led Extension to Market-led Extension (Adopted from MANAGE, 2008)

Aspects	Production-led extension	Market-led extension
Purpose/ Objective	Transfer of production technologies	Enabling farmers to get optimum returns out of the enterprise
Expected end results	Delivery of messages Adoption of package of practices by most of the farmers	High returns
Farmers seen as	Progressive farmerHigh producer	Farmer as an entrepreneur "Agripreneur"
Focus	Production / yields "Seed to seed"	Whole process as an enterprise / High returns "Rupee to Rupee"
Technology	Fixed package recommended for an agro-climatic zone covering very huge area irrespective ofdifferent farming situations	Diverse baskets of package of practices suitable to local situations/ farming systems
Extensionists' interactions	Messages Training Motivating Recommendations	Joint analysis of the issues Varied choices for adoption Consultancy
Linkages/ liaison	Research-Extension-Farmer	Research-Extension-Farmer extended by market linkages

Extensionists' role	Limited to delivery mode and feedback to research system	Enriched with market intelligence besides the TOT function Establishment of marketing and agro-processing linkages between farmer groups, marketsand processors
Contact with farmers	Individual	Farmers' Interest Groups Commodity Interest Groups /SHG's
Maintenance of Records	Not much importance as the focus wason production	Very important as agriculture viewed as an enterprise to understand the cost benefit ratio and the profits generated
Information Technology support	Emphasis on production technologies	Market intelligence including likely price trends, demand position, current prices, market practices, communication network, etc besides production technologies

Challenges to Market Led Extension

- Gigantic size of Public Extension System of the public extension in the country.
- Generation of data on market intelligence would be a huge task by itself.
- The present extension system suffers from several limitations of stationery, mobility, allowances, personal development of cadres etc.
- Infrastructure challenges.
- Storage and preservation of produce
- Minimization post-harvest losses.
- Capacity building of extension personnel and farmers.

Expert System

An Expert System is a software application that attempts to reproduce the performance of one or two more human experts. The concept of expert system development came from the subject domain of Artificial Intelligence (AI). The expert system is used to behave like a human expert to solve the problem with the help of pre-set conditions in the software application. The computer programme uses

---

Definition

Expert system is an intelligent computer program that uses knowledge and inferences procedures to solve problems.

-Daniel Hunt (1986)

Expert system can be defined as a tool for information generation from knowledge. It is a computer programme designed to stimulate the problem-solving behaviour of an expert in a narrow domain or discipline.

-Prasad and Babu (2008)

---

knowledge and inference procedures to solve problems.

An expert system is typically composed of at least three primary components. These are the inference engine, the knowledge base, and the user interface.
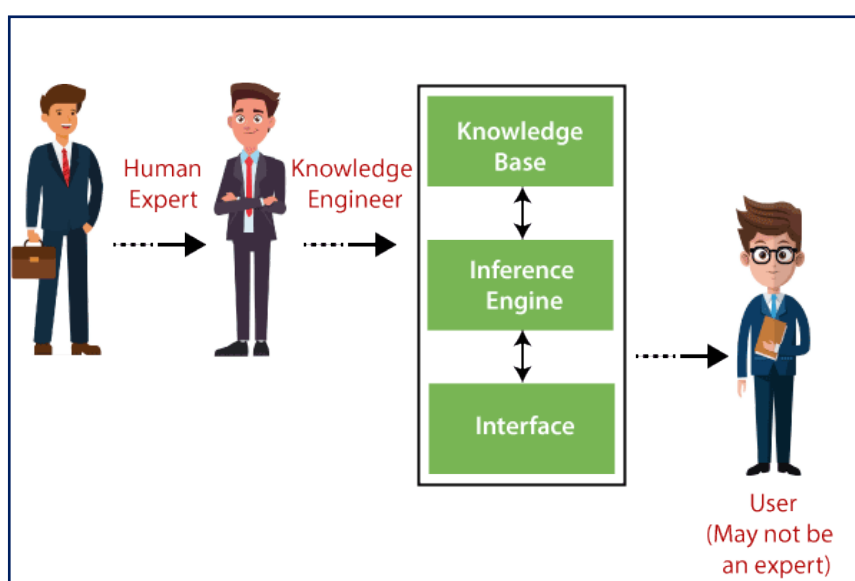

- Knowledge base - This component consists of data, facts and rules for a certain topic, industry or skill, usually equivalent to that of a human expert.

- Interference engine - This component uses the facts and rules in the knowledge base to find and learn new knowledge or patterns. It is responsible for gathering the information from the user, by asking various questions and applying it wherever necessary. It seeks information and relationships from the knowledge base and to provide answers, predictions and suggestions the way a human expert would.
- User interface -A user interface is the method by which the expert system interacts with a user.

Expert systems use information technology to gain and use human expertise. Obviously, this can be very beneficial to organizations. Expert Systems can:

1. Provide answers for decisions, processes and tasks that are repetitive
2. Hold huge amounts of information
3. Minimize employee training costs
4. Centralize the decision making process
5. Make things more efficient by reducing the time needed to solve problems
6. Combine various human expert intelligences
7. Reduce the number of human errors
8. Provide strategic and comparative advantages that may create problems for competitors
9. Look over transactions that human experts may not think of
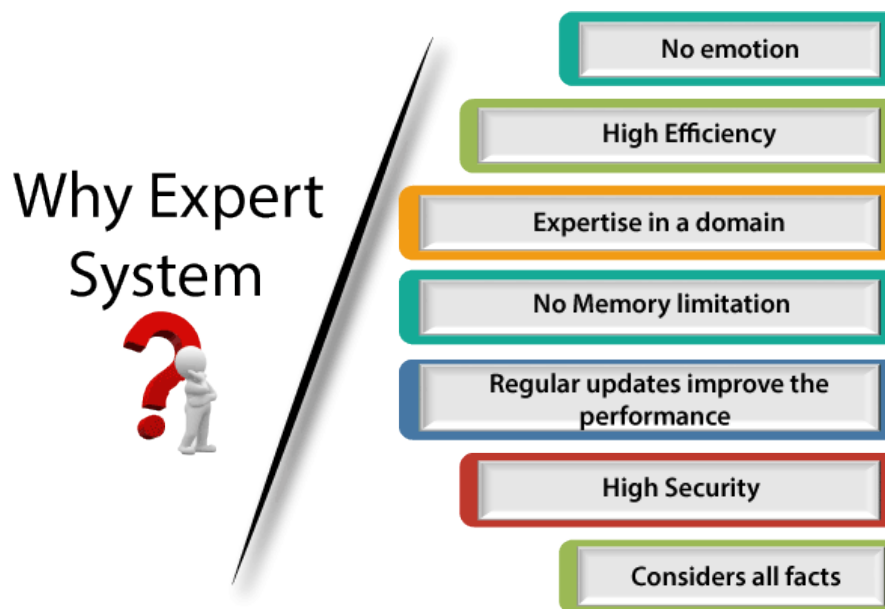
Objectives (Mondal, 2019)

The main objectives of developing expert system in agriculture are:

1. To enhance the performance of agricultural extension personnel and farmers.
2. To make farming more efficient and profitable.
3. To reduce the time required in solving the problems and performing the routine tasks of extension workers.

4. To maintain the expert system by continuously upgrading the database.

Difference between Conventional Extension and Expert System Extension

(Bahal *et al.*, 2004)

S.No.	Conventional Extension	Expert System of Extension
1.	Universal approachability of same information is a problem	Universal approachability of same information is possible
2.	Information is given whatever is available without considering needs and resources	Information is chosen based on theirneeds and resources
3.	No Cost benefit analysis	Cost benefit analysis
4.	Information flow depends on availability of agent	Information through Cyber Cafe at any place at any time
5.	Require usersto draw their own conclusion from facts	Conclusion is drawn based on the decision given by the expert

Examples of expert system in India

1. *Rice-Crop:* The MANAGE has developed an expert system to diagnose pests and diseases for rice crop and suggest preventive/curative measures. The rice crop doctor illustrates the use of expert-systems broadly in the area of agriculture and more specifically in the area of rice production through development of a prototype, taking into consideration a few major pestsand diseases and some deficiency problems limiting rice yield.

2. *Expert System on Wheat Crop Management:* EXOWHEM Expert system on wheat crop management is an expert system which includes all aspects of wheat production on India. The main goal of the system is to provide the users with all kinds of suggestions and advices regarding the wheat crop production. The system is designed as web based application by IASRI New Delhi that covers agricultural operations, fertilizer application, variety selection, as well as the economic benefits. It is purely a rule based expert system.

   AMRAPALIKA is an Expert System for the diagnosis of pests, diseases, and disorders in Indian Mango. The system makes diagnosis on the basis of response/responses of the user made against queries related to particular disease symptoms. A rule-based expert system is developed using Expert System Shell for Text Animation (ESTA). The knowledge base of the system contains knowledge about symptoms and remedies of 14 diseases of Indian mango tree appearing during fruiting season and non-fruiting season.

3. *e-Sagu:* is a tool for IT–based personalized Agro-Advisory system. ("Sagu" means cultivation in Telgu language). It aims to improve farm productivity by delivering high quality personalized (farm–specific) agro-expert advice in a timely manner to each farm at the farmer's door–steps without farmer asking

a question. In e-Sagu, the development of IT such as (Database, Internet, and Digital Photography) is extended to improve the performance of agricultural extension services. The e-Sagu system was implemented during 2004 by delivering advisory to 1051 cotton farms for the farmer of three villages in Warangal district in Andhra Pradesh.

Advantages
The advantages of expert system are:
1. Expert Systems are useful in many aspects and ready to use by end user as advisory system.
2. Provides consistent answers for repetitive decisions, processes and tasks.
3. Holds and maintains significant levels of information.
4. Encourages human expert to clarify and finalize the logic of their decision-making.
5. Never "forgets" to ask a question, as a human might.
6. They can respond at great speed due to the inherent advantages of computers over humans.
7. Unlike humans, they do not get tense, fatigue or panic and work steadily during emergency situations.

Disadvantages
However, there are also disadvantages to expert systems, such as:
1. Lacks common sense needed in some decision making.
2. Cannot make creative responses as human expert would in unusual circumstances.
3. Not capable of explaining the logic and reasoning behind a decision
4. Cannot adopt to changing environments, unless knowledge base is changed

Meaning, Definitions and Concept

Rural

According to **International Encyclopedia of Social Sciences**, there is a broad general consensus that the term rural refers emphatically to population living in the area of low density and to small settlements.

Development

The term development, according to Lale (1975) – is a process of improving standards of the masses of the low income population residing in rural areas making the process of rural development self-sustaining".

Rural Development

It is a strategy to improve the economic and social life of a specific group of people- the rural poor, including small and marginal farmers, tenants and landless. Rural Development is an improvement in the living standards of the masses of low income population residing in rural areas and making the process self-sustaining.

The term Rural and Development is used in different ways:-
- As a Concept – Development of Rural areas
- As a phenomenon- Interaction between institutional factors
- As a Strategy- Approach to bring positive change in rural life

Ultimate Objective of rural development is- *Improving the quality of life of rural poor and the rural weak*.

Concepts of Rural Development

Rural development is the dynamic process of development of the rural people through various programmes and projects so that they can become self-reliant citizens of the country. The work is done by involving various agencies and organizations, and above all, the local people themselves. It involves extending the benefits of development to the poorest among those who seek a livelihood in the rural areas. The group includes small scale farmers, tenants and the landless.

> According to *World Bank (1975)*,
> The rural development in general terms, is a strategy designed to improve economic and social life of people in a rural settlement and in particular, it focuses attention on the rural poor comprising the small and marginal farmers, tenants, and landless labourers.

As a phenomenon, rural development is the end result of interaction between

various physical, technological, economic, socio-cultural and institutional factors. motivate the people for adoption.

As a strategy, it is designed to improve the economic and social wellbeing of a specific group of people – the rural poor.

As a discipline, it is multidisciplinary in nature, representing an interaction of agricultural, social, behavioral, engineering and management sciences.

Rural Development is a process of developing and utilizing natural and human resources, technologies, infrastructural facilities, institutions and organizations, and government policies and programmes to encourage and speed up economic growth in rural areas, to create jobs and to improve the quality of rural life towards self-sustenance.

> **In the words of Robert Chambers (1983),** *Rural development is a strategy to enable a specific group of people, poor rural women and men, to gain for themselves and their children more of what they want and need. It involves helping the poorest among those who seek a livelihood in the rural areas to demand and control more of the benefits of rural development. The group includes small-scale farmers, tenants and landless.*

Various Rural Development Programme Launched by Government of India

Integrated Rural Development Programme (IRDP)

Integrated Rural Development Programme is a very major programme of poverty alleviation and rural development. The meaning of the term integrated, basically implies the provision of a package of interlinked programmes mutually supporting and reinforcing so that a one-dimensional approach to development is avoided so, the integration is horizontal, vertical, spatial and temporal.

Integration covers four principal dimensions:
  i. Integration of sectoral programmes
  ii. Spatial integration
  iii. Integration of social and economic process
  iv. The policies with a view to achieving a better fit between growth, removal of poverty and employment generation

Specifically, it involves a sharp focus on target groups, comprising small and marginal farmers, agricultural laborers and rural artisans, and an extremely location specific planning in rural areas.
  • IRDP was envisaged to help small and marginal farmers, agricultural laborers and rural artisans.

- The approaches followed for SFDA, MFAL, DPAP and CAD programmes were proposed to be utilized according to their relevance's in particular areas to generate employment opportunities and increase production.

Objectives

The main objectives are creating assets, employment, increased income removal of poverty and minimizing in equality.

IRD Programmes were
- Programmes of Agriculture Development including efficient utilization of land and water resources with scientific technology.
- Programmes of animal husbandry as a subsidiary occupation dirked mainly to small farmers and Agricultural Labour households.
- Programmes of marine fishery including harvesting of natural resources through trawlers, mechanized country boats.
- Programmes of social forestry and farm forestry.
- Programmes of village and cottage industries including handlooms, sericulture and beekeeping as important occupations for the artisan classes of the rural population.
- Programme of service sector of the rural economy as self-employment for poorer families.
- Programmes for skill formation and mobility of labour to meet the needs of organized labour for development works.

The IRDP concept was launched in 1978-79 in 2300 blocks in the country and it was extended to all blocks in the country with effect from 2to Oct. 1980.Simultaneously SFDA's were merged with IRDP.

Target Beneficiaries of IRDP
- IRDP focuses mainly on providing assistance (subsidiary and institutional credit) to selected families for income generating assets in order to range their incomes through self-employment so that they can move above the poverty line.
- IRDP follows the principle of the "poorer of the poor first". Hence, although the poverty line (PL) has been defined as Rs 6,400 as annual family income, only those families with an annual income of less than Rs 4,800 is eligible for assistance under this programme.

The target group includes:
- Small farmers, marginal farmers, agricultural laborers rural artisans and other families which are below the poverty line.
- At least 30 per cent of the families are to be drawn from SC's/STS.
- At least 30 per cent of the beneficiaries are to be women.

- The district rural development agency (DRDA) was created to function at the district level as a single agency for the implementation of IRDP, DPAP, DPP etc., to implement integrated rural development.
- Funds for the programme are released to DRDA's on the stipulation that expenditure should be equally shared by the centre and the state.

Short Comings/Drawbacks and Limitations of IRDP
- The resources provided were inadequate.
- There was large number of over dues.
- Poor quality of assets provided to the beneficiaries.
- The follow up of the beneficiaries was inadequate.
- Lack of training facilities to s-mall and marginal farmers.

Training of Rural Youth for Self Employment (TRYSEM)

TRYSEM was launched in 1979 as a separate national scheme for training rural youth for self employment. The compelling reasons for launching the programme being the huge backlog of unemployment and under employment among the rural youth. Forty youth, both men and women were to be selected in each block and trained in both skill development and entrepreneurship to enable them to become self-employed. It was generating activities in the rural areas; the influx of rural youth to urban areas could curb. Moreover, local needs could also meet with local resources, thereby giving a fillip to rural development.

Objectives of TRYSEM
- To provide rural youth (18-35 years) from families below the poverty line with training and technical skills to enable them to take up self-employment in agriculture, industry, services and business activities.
- Training is perceived not only in terms of provision of physical skills. But also change in attitude, enhancement of motivation and skills in human relations etc., are also ought to be imparted.
- Self-employment is defined as gainful employment on a full time basis which results in income which is sufficient for the family of the youth cross the poverty line. Situation of employment in which the means of production are owned, hired or taken on lease are taken to be self-employment situations.

Features of TRYSEM
- TRYSEM became the "self-employment for youth" component of IRDP and was introduced in all the 5000 blocks in the country.
- An identified youth will be put through a period of training either in a training institution or under a master crafts men.
- Duration of training is flexible depending upon types of courses.
- Trainers are given stipend and a tool kit.
- Successful trainee is eligible to receive a subsidiary/credit/income generating

asset under IRDP.

- At least 50 percent of the youth to be trained for self-employment either for secondary or tertiary sector activity.
- Wage employment training was to be in the secondary and tertiary sectors.
- BDO selects the eligible youth belonging to the target group with the help of VLW's.
- The identification of locations is done by the DRDA in consultation with district level officers of different departments.
- DRDA prepares a resource inventory for training facilities like ITI's polytechniques, KVI's, KVK's, NYK's etc.,
- DRDA is responsible for the implementation of TRYSEM.

Beneficiaries of TRYSEM

- Members of the poorest family first
- Priority should be given to members of SC's and ST's.
- At least 1/ 3 of candidates should be women.
- Preference should be given to persons who have completed the 12 month course under the national Adult Education programme.

Short coming of TRYSEM

- Implementation is generally uneven.
- Training lacked appropriate technology in the package provided.
- In the selection of trade, self-employment opportunities and financial viability were not adequately assessed.
- Assistance in the provision of raw materials and marketing has been lacking.
- Every district did not have training centers of TRYSEM.
- In a large number of cases, the assistance provided to TRYSEM trainees from IRDP projects had no link to the training they had received

Various Rural Development Programme Launched by Government of India

Jawahar Rozgar Yojana (JRY) - 1979

The finance minister announced a new scheme which aimed at providing employment in backward districts with chronic poverty and unemployment. This new scheme was named as Jawaharlal Nehru Rozgar Yojana. It was also stated in 1979 and the NREP and RLEGP would be merged into one programme and implemented as a centrally sponsored scheme with a 80:20 sharing funds between the centre and the states. Later it was called as JRY.

Objectives
- To generate additional gainful employment for the unemployed rural youth.
- To create productive community assets which would benefit the poor sections thus, strengthening the rural infrastructure.
- To improve the overall quality of life in areas.

Main features of JRY
- The target group comprises persons living below poverty line.
- Preference is given to SC's and ST's among the poor.
- At least 30 per cent of the beneficiaries are women.
- All works which lead to creation of durable community assets can be taken up.
- Higher priority is to be given to works which are required as infrastructure under poverty alleviation programmes.
- For social forestry works the participation of non-governmental organizations (NGOS) is ought.
- DRDA's/ Zilla Parishads are responsible for implementation of JRY at district level and village panchayats at the Gram Panchayats Level.

Swarnjayanti Gram Swarojgar Yojana (SGSY) - 1999

This Scheme was launched after a review and restructuring of the previous Integrated Rural Development Program(IRDP) and allied schemes like Training of Rural Youth for Self Employment (TRYSEM), Development of Women and Children in Rural Areas (DWCRA), Million Wells Scheme (MWS), Supply of Improved Toolkits to Rural Artisans (SITRA) & Ganga Kalyan Yojna. SGSY was launched on April 1, 1999 and is the only self-employment Programme currently being implemented. The objective of the SGSY is to bring the assisted Swarozgaris above the poverty line by providingthem income generating assets through bank credit and Government subsidy. The Scheme is being implemented on a 75:25 cost sharing of between the Centre and the States.

In the Union Budget 2009-10, Allocations of Rs. 2350 Crore was made for

establishing micro- enterprises in rural areas through activity clusters and group approach under Swaranjayanti Gram Swarozgar Yojana. At least 50% of the Swarozgaries will be SCs/STs, 40% women and 3% disabled.

Objectives

- Focussed Approach to poverty Alleviation by setting up a large number of Micro enterprises in rural areas of our country. Capitalising group lending.
- Overcoming the problem of running multiple programmes overlapping each other. A holistic programme of micro enterprises covering all aspects of self employment which includes organising rural poor into Self help groups. Integration of various agencies like District Rural Development Agencies, Bank, Line Departments., Panchayati Raj Instituions, NGOs etc. Bring the assisted poor family above BPL by providing them a mix of income generating assets like bank credit + Government subsidy.
- National Livelihood Mission: India's Ministry of Rural Development is proposing to re-design the Swarnjayanti Gram Swarojgar Yojana (SGSY) into National Livelihood Mission (NRLM).

Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) - 2006

Mahatma Gandhi National Rural Employment Guarantee Act'(MGNREGA) was launched in *February 2006*. Undoubtedly, it is one of the largest, most ambitious and wide ranging social security programmes in the world.

The preamble to the act reads as under –

An act to provide for the enhancement of livelihood security for the households in rural areas ofthecountrybyprovidingatleastonehundreddaysofguaranteedwageemploymentinevery financial year to every household whose adult members volunteer to do unskilled manual work and for matters connected there with or incidental there to.

The Act was notified in 200 rural districts in its first phase of implementation (with effect from Feb 2, 2006). In financial year 2007-08, it was extended to additional 130 districts. The remaining districts were notified under MGNREGA with effect from April1, 2008.

Since 2008, MGNREGA has covered the whole of India barring the districts that have hundred percent urban populations.

Mandate and Objectives

The mandate of the act is to provide 100 days of guaranteed wage employment in a financial year (FY) to every rural household whose adult members volunteer to do unskilled manual work. In this Act "Adult" means a person who has completed his eighteenth year of age and a "household" is defined as members of a family related to each other by blood, marriage or adoption and normally residing together and sharing meals.

The Objectives of the Programme includes

- Ensuring social protection for the most vulnerable sections of people residing in rural India through wage employment opportunities. Chapter III of the Act calls upon every State Government to make a Scheme (National Rural Employment Guarantee Scheme, NREGS) to give effect to this objective.

- Ensuring livelihood security to the poor through creation of durable assets which would lead to sustainable development and in due course diminish the dependence of rural folk on schemes such as NREGS.

- MGNREGA- Guidelines 2013 provide for a number of labour intensive works which can be undertaken in the NREGS so as to create valuable assets leading to improved water security, soil conservation, higher land productivity, strengthening drought proofing and flood control.

- Ensuring empowerment of the marginalized communities in rural India, especially women Schedule Castes (SCs) and Scheduled Tribes (STs) and the aged through the rights based programme. MGNREGA envisions 100 days of guaranteed employment as a matter of right to every rural household.

- Strengthening decentralized, participatory planning and execution through convergence of various anti-poverty and livelihood initiatives.

- The Scheme to begin with aimed to merge Sampoorna Gramin Rojgar Yojana' (SGRY) and National Food for Work program (NFWP) and bring the provisions of these two programmes within the ambit of NREGS.

- Deepening democracy at the grassroots by strengthening the Panchayati Raj Institutions by ensuring planning, implementation and supervision of the programme at the lowest levels. Panchayati Raj Institutions (PRI) are systems of Local Government in rural India at three levels of administration; village, block and district. Gram Panchayat (GP) is a primary unit of the three- tier structure of local self-governance in rural India. At the intermediate level of PRIs lies the 'Block'. A Block means the community development area within a district comprising a group of Panchayats. _Block Samiti' is the executive body at the intermediate level, while_Zila Parishad' is the executive body at the district level and lies at the top of PRIs in India. The MGNREGA envisages Gram Panchayat, Block Samiti and Zila Parishad as

- important hierarchical levels for the purpose of implementation of the scheme, enjoining certain duties upon the State and Central Governments at the same time.

- Stemming the tide of migration of rural population to urban areas through the availability of work in or near the village. Provision of decent work at reasonably good wages is one of the prime objectives of the Act.

Salient Features of the Act

- **Registration:** Adult members of Rural Household willing to do unskilled manual work may apply for registration either orally or in writing to the concerned Gram Panchayat. It is noteworthy that the unit of registration is

house hold (HH). The act aims to provide 100 days of employment to a rural household.

- **Job Card:** It is the duty of the Gram Panchayat headed by the 'Pradhan or Sarpanch' to verify the place of residence, age of the members of a house hold etc. and to issue the job card (JC) to the household after due registration.Job card is a very important document and forms the basis for identification, demanding employment and updating the number of days for which employment was provided and wages paid. A Job Card is to have a unique identification number and the Act provides that it should be issued within 15 days of application for registration.

- **Demand for Work:** A written application is to be made by any of the registered members of the household to the GP or Block Office stating the time period for which the work is sought. It is incumbent on the part of the GP to acknowledge the receipt of written application against which the guarantee to provide employment within 15 days operates. The application can be filed individually or in groups and must be for at least fourteen days of continuous work. Multiple applications can be made in advance provided the periods for which employment is sought don't overlap. Applicants provided with work are to be notified in writing or by public notice at the office of Gram Panchayat.

- **Unemployment Allowance:** The Gram Panchayat and the Programme Officers shall ensure that every applicant shall be provided unskilled labour work as per provisions within 15 days of application for work or from the date from which work was sought whichever is later. Priority shall be given to women in such a way that one third of the beneficiaries shall be women who have registered and requested for work. In case employment is not provided within 15 days, the State (as per the Act) will pay an unemployment allowances to the beneficiary. The rate of unemployment allowance shall not be less than one fourth of the wage rate for the first thirty days during the financial year and not less than one half of the wage rate for the remaining period of the financial year till the applicant or any other number of his household is called to report for work or the allowance in lump sum becomes equal to the amount in terms of wages for 100 days of work for the financial year.

- **Wages:** Wages are to be paid as per the state wise Government of India (GOI) notified MGNREGA wages. Wages are to be paid according to piece rate as per the Schedule of Rates (SORs) without any gender bias.

- **Planning, Implementing and Monitoring:** The Panchayats at district, intermediate and village levels are the principal authorities for planning and implementation of the scheme made under this Act.

The functions of the Panchayats at the district level

i. To finalize and approve block wise shelf of projects to be taken up under the scheme.

ii. To supervise and monitor the projects taken up at the block and district level.

Central and State Employment Guarantee Councils: In order to monitor the implementation of the scheme at the State and Central Government levels, separate Central and State employment GuaranteeCouncilshavebeensetup.Additionally,thesecouncilsperformadvisoryfunctio nson all matters concerning the scheme to the respective Governments and prepare annual reports pertaining to the scheme to be submitted before the State legislative.

Community

A community is a group of people, who live in a geographical area and have interests in each other for the purpose of making a living It is a farm of social organization existing between the family and state. A community, while in itself consisting of several parts, is also a part of a larger social system. It is a dynamic social unit, which is subject to change of internal or external origin. Some of the important characteristics of the community are

1. Communities reclose-knit
2. Their customs are interrelated
3. These communities are complexes of sub-group relationship and
4. There is a discernible leadership within the community.

Development

The term development connotes growth or maturation. It implies gradual and sequential phases of change. By understanding the above terms, we can say that community development programmes means a programme for gradual change in a group of people living in a geographical area and have interest in each other for making a living.

Concepts of Community Development

Community development is an exclusive term. It is frequently used to encompass any and every effort towards the advance of community interests. A variety of interpretations is therefore easily available. Community development is a compound term. It is useful, therefore,to consider its components.

1. Community development is a movement designed to promote better living for the whole community with the active participation and on the initiative of the community.

2. Community development is a balanced programme for stimulating the local potential for growth in every direction. Its promise is of reciprocal advance in both wealth and wealth and welfare, not on the basis of outside charity but by building on the latent vitality of the beneficiaries themselves with the minimum of outside aid.

3. Community development is technically aided and locally organized self help.

4. The term community development has come into international usage to denote the process by which the efforts of the people themselves are united with those the governmental authorities to improve the economic social and cultural conditions of the communities, to integrate these communities into the life of the nation and enable them to contribute fully to national progress.

5. Community development is the term used to describe the technique which

many governments have adopted to reach their village people and to make more effective use of local initiative and energy for increased production and better living standards.

6. Community development is a process of social action in which the people of a community organize themselves for planning and action, define their needs and problems.

Community Development Programme

The community development programme was started in India just after independence (2 Oct., 1952). It was a multi project programme with the aim of an overall development of rural people. This programme consisted of agriculture, animal husbandry, irrigation, cooperation, public health, education, social education, communication, village industries etc. In fact, all these aspects of life relate to the 80 per cent of India's farming population. There are officials for each activity at district level to plan, execute and evaluate the programme up to thevillagelevel.

The community development programme having a principle feature which gives the ideas about programme.
1. It has undertaken a countrywide programme of rural development.
2. An extension service well manned and trained is being placed right in the village and at the block level to assist and guide the rural people.
3. A big scheme for orientation and training of personnel has been undertaken to provide trained workers of or the community development programme.
4. The promotion of local leadership through education and training on a scale commensurate with the programme of community development is now urgently called for.
5. The promotion of youth programmes as an integral part of the community development programme is being taken up and will have much contribution to make to the education of rural youth.

Main Lines of Activity in Community Development Programme
a) Agriculture and Related Matters
b) Irrigation:
c) Communication:
d) Education
e) Health
f) Supplementary Employment
g) Housing
h) Training
i) Social Welfare

Organizational Set-up for Community Development Extension Service
The organizational set-up for Community development Programme runs from the national level through state, district and block levels to the village level and there are three main constituents of this new set-up.

1. The direct-line staff such as State Development Commissioner, B.D.O and Village Level Worker.
2. The auxillary or specialist staff, such as different heads of technical departments at the state and district levels and extension officers at the block level.
3. Panchayati Raj System- The Zila Parishads, Block Samitis and Village Panchayats.

Principles of Community Development

Canadians Michael and Julie Bopp described the principles of community development as follow:

1. Harnessing Community Tensions
2. Facilitating Consultation about Community Realities and Needs
3. Maintaining Unity and Healthy Human Relations
4. Developing a Common Vision of Sustainable Future
5. Supporting Core Group Development
6. Personal Revitalization and Healing
7. Facilitating Learning
8. Building Effective Organizations
9. Networking with Resources and Allies
   (a) Programme Development
   (b) Reflection on the Process: Monitoring and Evaluation:
   (c) Protecting the Process

Philosophy of Community Development Programme

1. Work based on "felt needs
2. Work based on assumption that people want to be free from poverty and pain
3. It is assumed that people wish to have freedom in controlling their own lines and deciding the forms of economic, religious, education and political institutions, under which they will live.
4. People's values given due consideration
5. Self-Help
6. People are the greatest resource
7. The programme involves a change in attitude, habits, ways of thinking relationship among people in the level of knowledge and intellectual advancement of people, changes in their skills, i.e. practices of agriculture health etc.

Stages of Community Development

There are three stages that community development processes go through:

Stage One: Relationship Building
Stage Two: Process Development
Stage Three: The Consolidation of Structures and Mechanisms

Limitations

1. Most of the people are still illiterate and it is a difficult task to train about million people living in villages.
2. Lack of communication channels, lack of roads, lack of vehicles are the major limitation of community development programmes.
3. Limitations of funds and staff for training farmers.
4. A traditional society, with old ways and practices does not want to take risk unless it sees the result.
5. In an illiterate, traditional society the real leadership could not come forward.
6. Preaching to rural people and educating them in new practices requires very careful handling and needs highly skilled workers who have knowledge of "how change take place" and the skill to induce them.

Meaning of Leader

A leader is anyone who influences a group towards obtaining a particular result. Leader is a person who guides, inspires or rules others. In other words, he/she has a considerable following and he/she exerts substantial influence upon his/her following. He/she has the ability to organize their behaviour towards the fulfillment of their interests and goals. A leader is one who comes to prominence among a group of people by virtue of some traits and qualities and/or situations. It is because of these qualities and situations that the people respect, obey and follow the leader.

> ***Ordway Tead*** defines leadership as "the activity of influencing people to cooperate towards some goal which they come to find desirable."
>
> ***Dahama & Bhatnagar*** defines leadership as "Leader is a person who has been spontaneously considered or chosen as being influential".
>
> According to ***Davis (1977)*** "Leadership is the ability to persuade others to seek defined objectives enthusiastically".

Characteristics of leadership

  i) Leadership is the result of a group phenomenon.
  ii) It is a process of interaction.
  iii) A process of interpersonal relations underlines leadership.
  iv) In leadership power is created through the integration of diverse purposes and the intelligent use of individual differences.
  v) The interpersonal relations are influenced and structured by the nature and structure of the social system in which the group is placed.
  vi) Leadership is related to situation.
  vii) Leader represents the whole group.
  viii) Leader speaks on behalf of the group.
  ix) Leader helps the group in sorting out the plans for achieving the goals.

Concept of Rural Leadership

Leadership in rural areas requires particular traits. It is an interesting social phenomenon. In villages, the degree of interaction between the leader and villagers is high. Various groups in villages determine the pattern of leadership in villages.Leadership in rural areas functions amidst of small groups. The human relations approach is also important, as most of the villagers are ignorant, innocent, needy and sensitive.

Functions of Leaders

There is no unanimity of opinion as to what the functions of leadership are. Generally speaking leadership functions are related to goal achievement and to the maintenance and strengthening of the group. According to Barnard, a leader performs four main functions. They are:

- Determination of objective
- Manipulation of means
- Control of the instrumentality of action
- Stimulation of coordination action

According to **Dahama and Bhatnagar (1985)** following are the functions:

i. Executive
ii. Planner
iii. Policy maker
iv. Expert in human relations as well as technical field.
v. External group representative
vi. Controller of internal relationship
vii. Purveyor of reward and punishment
viii. Arbitrator
ix. Exemplar
x. Group symbol
xi. Surrogate of individual responsibility
xii. Idealist
xiii. Father figure
xiv. Scape goat.

Classification of Leaders

Different authors classified the leaders in different ways. Some of the classifications are:

(A) **Beal, Bohlen and Raudabaugh** *(1962)* classified the leaders into four types as;

i. Born leaders
ii. Passive leaders (personal power or characteristic leader)
iii. Bureaucratic leaders
iv. Democratic leaders

(B) **Mott** *(1972)* spoke about three major leadership categories

i. Democratic
ii. Multifactor
iii. Situational

(C) **Henning** *(1962)* analyzed the leadership and given the following three:

i. Autocrat
ii. Bureaucrat
iii. Neurocrat

(D) *Lester (1975)* also pointed three types as:
  i. Autocratic
  ii. Democratic
  iii. Free rein

(E) *Haiman (1951)* described five categories as the
  i. Executive
  ii. Judge
  iii. Advocate
  iv. Expert
  v. Discussion leader

(F) **Carter (1961)** identified three leadership patterns according to the manner in which the leader was mostly oriented. They are,
  i. Personal
  ii. Institutional
  iii. Flexible

(G) *Sachdeva and Vidyabhushan (1974)* studied three main leadership types as;
  i. Authoritarian
  ii. Democratic
  iii. Laissez-faire

(H) *Dahama and Bhatnagar (1985)* found several ways of classifying leaders, some of them are;
  i. Democratic,
  ii. Autocratic
  iii. Laissez-faire
  iv. Formal and informal leaders
  v. Professional
  vi. Lay (voluntary) leaders
  vii. Political,
  viii. Religious,
  ix. Social
  x. Academic
  xi. Elected,
  xii. Selected or nominated
  xiii. Popular
  xiv. Unpopular
  xv. Traditional
  xvi. Progressive leaders

Extension administration is organization and direction of human and material resources to achieve desired ends.

Management v/s Administration

Those who held management and administration distinct include **Oliver Sheldon, Florence and Tead, Spriegel and Lansburg**, etc. According to them, management is a lower-level function and is concerned primarily with the execution of policies laid down by administration. But some **English authors like Brech** are of the opinion that management is a wider term including administration. This controversy is discussed as under in three heads:

(a) Administration is concerned with the determination of policies and management with the implementation of policies. Thus, administration is a higher level function.

(b) Management is a generic term and includes administration.

(c) There is no distinction between the terms management and administration and they are used interchangeably.

S. No.	Basis	Administration	Management
1.	Meaning	Administration is concerned with the formulation of objectives, plans the work and policies of the organization	Management means getting done through and with others.
2.	Nature of work	Administration relates to the decision- making. It is a thinking function.	Management refers to execution of decisions. It is a doing function.
3.	Decision making	Administration determines what is to be done and when it is to be done	Management decides who shall implement the administrative decisions.
4.	Status	Administration refers to higher levels of management	Management is relevant at lower levels in the organization.

Principles of Management

A body of principles of management has been developed by **Henri Fayol**, *the father of modern management*. Fayol wrote perceptibly on the basis of his practical experience as a manager. Although, he did not develop an integrated theory of management, his principles are surprisingly in tune with contemporary thinking in management theory. Fayol held that there is a single "administrative science", whose

principles can be used in all management situations no matter what kind of organization was being managed. This earned him the title of "Universality". He, however, emphasized that his principles were not immutable laws but rules of thumb to be used as occasion demanded. Fayol held that activities of an industrial enterprise can be grouped in six categories:

(i) Technical (production)
(ii) Commercial (buying, selling and exchange)
(iii) Financial (search for and optimum use of capital)
(iv) Security (protection of property and persons)
(v) Accounting (including statistics)
(vi) Managerial.

However, he devoted most of his attention to managerial activity. He developed the following principles underlying management of all kinds of organizations:

1. Authority and Responsibility are Related
2. Unity of Command
3. Unity of Direction
4. Scalar Chain of Command
5. Division of Work
6. Discipline
7. Subordination of Individual Interest to General Interest
8. Remuneration
9. Centralisation
10. Order
11. Equity
12. Stability of Tenure of Personnel
13. Initiative
14. Esprit de Corps

Management Functions /Process of Management

Henri Fayol identifies **five** functions of management, viz. planning, organizing, commanding, coordinating and controlling.

Luther Gulick states **seven** such functions under the catch word **"POSDCORB'** which stands for planning, organizing, staffing, directing, coordinating, reporting and budgeting.

For our purpose, we shall designate the following six as the functions of a manager: planning, organizing, staffing, directing, coordinating and controlling.

*Planning:*Planning is the most fundamental and the most pervasive of all management functions. If people working in groups have to perform effectively, they should know in advance what is to be done, what activities they have to perform in order to do what is to be done, and when it is to be done. Planning is concerned with 'what', 'how, and 'when' of performance. It is deciding in the present about the future

objectives and the courses of action for their achievement. It thus involves:

Determination of long and short-range objectives;

- Development of strategies and courses of actions to be followed for the achievement of these objectives; and

- Formulation of policies, procedures, and rules, etc., for the implementation of strategies, and plans.

Organizing: Organizing involves identification of activities required for the achievement of enterprise objectives and implementation of plans; grouping of activities into jobs; assignment of these jobs and activities to departments and individuals; delegation of responsibility and authority for performance, and provision for vertical and horizontal coordination of activities. Organizing thus involves the following sub-functions:

- Identification of activities required for the achievement of objectives and implementation of plans.

- Grouping the activities so as to create self-contained jobs.

- Assignment of jobs to employees.

- Delegation of authority so as to enable them to perform their jobs and to command the resources needed for their performance.

- Establishment of a network of coordinating relationships.

Staffing: Staffing is a continuous and vital function of management. After the objectives have been determined, strategies, policies, programmes, procedures and rules formulated for their achievement, activities for the implementation of strategies, policies, programmes, etc. identified and grouped into jobs, the next logical step in the management process is to procure suitable personnel for manning the jobs. Since the efficiency and effectiveness of an organization significantly depends on the quality of its personnel and since it is one of the primary functions of management to achieve qualified and trained people to fill various positions, staffing has been recognized as a distinct function of management. It comprises several sub-functions:

- Manpower planning involving determination of the number and the kind of personnel required.

- Recruitment for attracting adequate number of potential employees to seek jobs in the enterprise.

- Selection of the most suitable persons for the jobs under consideration.

- Placement, induction and orientation.

- Transfers, promotions, termination and layoff.

- Training and development of employees.

Directing: Directing is the function of leading the employees to perform efficiently,

and contribute their optimum to the achievement of organizational objectives. Jobs assigned to subordinates have to be explained and clarified, they have to be provided guidance in job performance and they are to be motivated to contribute their optimum performance with zeal and enthusiasm. The function of directing thus involves the following sub-functions:

- Communication
- Motivation
- Leadership

*Coordination:*Coordinating is the function of establishing such relationships among various parts of the organization that they all together pull in the direction of organizational objectives. The significance of the coordinating process has been aptly highlighted by Mary Parker Follet. The manager, in her view, should ensure that he has an organization "with all its parts coordinated, so moving together in their closely knit and adjusting activities, so linking, interlocking and interrelation, that they make a working unit, which is not a congeries of separate pieces, but what I have called a functional whole or integrative unity". Coordination, as a management function, involves the following sub-functions:

- Clear definition of authority-responsibility relationships
- Unity of direction
- Unity of command
- Effective communication
- Effective leadership

*Controlling:*Controlling is the function of ensuring that the divisional, departmental, sectional and individual performances are consistent with the predetermined objectives and goals. Thus, controlling involves the following process:

- Measurement of performance against predetermined goals.
- Identification of deviations from these goals.
- Corrective action to rectify deviations.

Reporting: According to this principle, the executive should keep those, to whom the executive is responsible, informed as to what is going on in the organization so that timely control can be exercised. It includes keeping himself and his subordinates informed through records and Inspections.

Budgeting: It is the most important principle without which rest of the six principles can achieve nothing. It takes the form of fiscal planning, accounting and financial control.

Monitoring

Monitoring is a continuous/ periodic review and surveillance by management, at every level of the implementation of an activity to ensure that input, deliveries, work schedules, targeted outputs and other required actions are proceeding according to plan.

Monitoring is a continuous assessment that aims at providing all stakeholders, with early detailed information on the progress or delay of the ongoing assessed activity. It is an oversight of the implementation stage of the activity. Its purpose is to determine if the outputs, deliveries and schedules planned have been reached so that action can be taken to correct the deficiencies as quickly as possible. In monitoring, the purpose is to ascertain whether project objectives are achieved. This is carried out in terms of;

- Whether the various tasks are carried out according to schedule.
- Whether project impact is in accord with project objectives.
- Whether project objectives/ targets/ execution needs adjustments.

Thus, monitoring is a management function and begins with the start of a project and ends with the completion of project.

Advantage of Monitoring

(i) It help to improve the task to be carried out
(ii) It increases the efficiency of resources
(iii) Help to spot strengths and weakness of implementation
(iv) Cost effectiveness

Evaluation

Term evaluation has its origin from Latin word "Valupure" which means the value of a particular this, idea or action.

Evaluation is the periodic comparison of actual results and impacts with those planned or expected, judging the overall worth of an endeavour and learning lessons to improve future action.

The systematic and objective assessment of an on-going or completed project, programme or policy, its design, implementation and results. The aim is to determine the relevance and fulfilment of objectives, development efficiency, effectiveness, impact and sustainability. Anevaluation should provide information that is credible and useful, enabling the incorporationof lessons learned into the decision-making process of both recipients and donors." Evaluation also refers to the process of determining the worth or significance of an activity, policy or programme.

Type of Evaluation

Process evaluation

Process evaluation is used to "measure the activities of the program, program quality and who it is reaching". Process evaluation, as outlined by Hawe and colleagues will help answer questions about your program such as:

- Has the project reached the target group?
- Are all project activities reaching all parts of the target group?
- Are participants and other key stakeholders satisfied with all aspects of the project?
- Are all activities being implemented as intended? If not why?
- What if any changes have been made to intended activities?
- Are all materials, information and presentations suitable for the target audience?

Impact evaluation

Impact evaluation is used to measure the immediate effect of the program and is aligned with the programs objectives. Impact evaluation measures how well the programs objectives (and sub-objectives) have been achieved. Impact evaluation will help answer questions such as:

- How well has the project achieved its objectives (and sub-objectives)?
- How well have the desired short term changes been achieved?

Impact evaluation measures the program effectiveness immediate after the completion of the program and up to six months after the completion of the program.

Outcome evaluation

Outcome evaluation is concerned with the long term effects of the program and is generally used to measure the program goal. Consequently, outcome evaluation measures how well the program goal has been achieved. Outcome evaluation will help answer questions such as:

- Has the overall program goal been achieved?
- What, if any factors outside the program have contributed or hindered the desired change?
- What, if any unintended change has occurred as a result of the program?

Outcome evaluation measures changes at least six months after the implementation of the program (longer term). Although outcome evaluation measures the main goal of the program, it can also be used to assess program objectives over time.

Summative evaluation

It occurs at the end of a program cycle and provides an overall description of program effectiveness. Summative evaluation examines program outcomes to determine overall program effectiveness. Summative evaluation is a method for answering some of the following questions:

- Were your program objectives met?
- Will you need to improve and modify the overall structure of the program?
- What is the overall impact of the program?

- What resources will you need to address the program's weaknesses?
- Do you continue the program?
- If so, do you continue it in its entirety?
- Is it possible to implement the program in other settings?
- How sustainable is the program?
- What elements could have helped or hindered the program?
- What recommendations have evolved out of the program?

Summative evaluation will enable to make decisions regarding specific services and the future direction of the program that cannot be made during the middle of a program cycle. Summative evaluations should be provided to funders and constituents with an interest in the program.

Formative evaluation

It is an on-going process that allows for feedback to be implemented during a program cycle. Formative evaluations concentrate on examining and changing processes as they occur. It provide timely feedback about program services and allow to make program adjustments "on the fly" to help achieve program goals.

Indicators for evaluation

Indicators are necessary to help determine what data needs to be collected to assist in assessing the progress of the program and if it is on track to achieving its goals and objectives. Indicators for evaluation classified into two categories;

Process indicators

Process indicators monitor the implementation of the program as well as program inputs. Program input indicators are related to: financial resources, human resources, administrative resources and equipment required.

Process indicators for the program itself monitor how well the program is implemented, if it is reaching the intended target and if it is of an acceptable quality. Program reach indicators include:
- Number of participants
- Proportion of the target population participating in the program
- The proportion of that participants attend or are involved
- Dropout rate
- Number of key stakeholders involved.
- Participant satisfaction can be assessed using the following indicators:
- Do participants feel comfortable, listened to and understood?
- Are other participants and staff friendly and approachable?
- Is the venue and set up appropriate to the audience and the group activities?
- Is the program affordable and run at convenient times?
- Do the topics covered meet the program's purposes, and are they interesting and relevant?
- Are the topics too confronting, too complex or covered adequately?

- Program implementation can be assessed using the following indicators:
- Number of workshops conducted
- All activities were implemented
- Material used caught people's attention
- Materials were easy to comprehend
- Materials used were appropriate for the target audience
- Media coverage achieved.

Impact and outcome indicators

Impact indicators monitor the progress of achieving the program's objectives, which usually relate to some type of short-term changes. In particular impact indicators will usually relate to changes in knowledge, attitudes and intended behaviour. Outcome indicators are used to assess if the program goal has been achieved and are therefore more likely to include actual behaviours, health status and quality of life (longer term changes or changes sustained over time).

Impact indicators may include:

- Changes in awareness, knowledge and skills
- Changes in intended behaviour
- Changes in individual capacity, i.e. confidence, self esteem, social skills, problem solving skills, increased help-seeking behaviour, coping skills and optimism
- Increased confidence
- Increased social networks
- Improved relationships.

Outcome indicators may include

- Increased mental wellbeing
- Increased physical wellbeing
- Community engagement
- Increased education
- Increased employment.

Purposes of Evaluation

1) Ensuring planned results are achieved
2) Emphasis on checking progress towards the achievement of an objective.
3) Improving and support management
4) Generating shared understanding
5) Generating new knowledge and support learning
6) Building the capacity of those involved
7) Motivating stakeholders
8) Ensuring accountability
9) Fostering public and political support
10) Management decision-making

11) Organisational learning
12) Soliciting support for programmes

Challenges of Evaluation
1) Assessing long term impacts
2) Dealing with uncertainty
3) Reconciling different agendas
4) Needing to simplify what is complex
5) Creating a learning culture
6) Coping with political imperatives
7) Overcoming a lack of capacity
8) Managing conflict

Differences between Monitoring and Evaluation

Monitoring and evaluation are important management tools that are necessary to track the progress; however, there are lots of differences between them. Some of the major differences between monitoring and evaluation are listed below:

Monitoring	Evaluation
Monitoring is the systematic and routine collection of information about the programs/projects activities	Evaluation is the periodic assessment of the programs/projects activities
It is ongoing process which is done to see if things/activities are going on track or not i.e. it regularly tracks the program	It is done on a periodic basis to measure the success against the objective i.e. it is an in-depth assessment of the program
Monitoring is to be done starting from the initial stage of the projects	Evaluation is to be done after certain point of time of the project, usually at the mid of the project, completion of the project or while moving from one stage to another stage of the projects/programs
Monitoring is done usually by the internal members of the team	Evaluation is done mainly done by the external members. However, sometimes it may be also done by internal members of the team or by both internal and external members in a combined way
Monitoring provides information about the current status and thus helps to take immediate remedial actions, if necessary	Evaluation provides recommendations, information for long term planning and lessons for organizational growth and success
It focuses on input, activities and output	It focuses on outcomes, impacts and overall goal
Monitoring process includes regular meetings, interview, monthly and quarterly reviews etc. Usually quantitative data.	Evaluation process includes intense data collection, both qualitative and quantitative
It has multiple points of data collection	Data collection is done at intervals only

It gives answer about the present scenario of the project towards achieving planned results considering the human resources, budget, materials, activities and outputs	It assesses the relevance, impact, sustainability, effectiveness and efficiency of the projects
Monitoring studies the present information and experiences of the project	Evaluation studies the past experience of the project performance
Monitoring checks whether the project did what it said it would do	Evaluation checks whether what the project did had the impact that it intended
Helps to improve project design and functioning of current project	Helps to improve project design of future projects
Monitoring looks at detail of activities	Evaluation does not look at detail of activities but rather looks at a bigger picture
It compares the current progress with the planned progress	It looks at the achievement of the programs along with both positive/negative, intended/unintended effects
Information obtained from monitoring is more useful to the implementation/management team	Information obtained from evaluation is useful to all the stakeholders
Monitoring result is used for informed actions and decisions	Evaluation result is used for planning of new programs and interventions
Answers the question "Are we doing things right?"	Answers the question "Are we doing right thing?"
Regular report and updates about the project/program act a deliverables here	Reports with recommendations and lessons act as a deliverable here
Good or effective monitoring does not rely on evaluation results	Good or effective evaluation relies to some extent on good monitoring
There are few quality checks in monitoring	There are many quality checks in evaluation
It provides information for evaluation	It provides information for proper planning

*Methods and tools of Monitoring & Evaluation*
1. **Test:** Pre and Post Test and Test Against Control Groups
2. **Participation:** Attendance, Completion, Certificates, Follow-On Tracking
3. **Data Collection:** Surveys, Questionnaires, Interviews, Checklists, Feedback forms
4. **Financial Reports:** Cost to budget, Cost per unit of service, On time on budget
5. **Performance:** Grades, Graduation, Drop in recidivism, Job placement, Permits, inspections, certifications
6. **Subjective (Qualitative):** Journals, Testimonials, Observations, Photographs, Clippings

Transfer of Technology

The term technology transfer can be defined as the process of movement of technology from one entity to another. The transfer may be said to be successful if the receiving entity, the transferee, can effectively utilise the technology transferred and eventually assimilate it. The movement may involve physical assets, know-how, and technical knowledge. Technology transfer has also been used to refer to movements of technology from the laboratory to industry, developed to developing countries, or from one application to another domain.

ModesandMechanismsofTechnologyTransfer

A. **The Bar-Zakay Model:**Bar-Zakay (1971) developed a rather comprehensive TT model based on aprojectmanagementapproach.HedividedtheTTprocessintotheSearch,Adaptation,Implementation,andMaintenancestages.Hedepictedtheactivities,milestones, anddecisionpoints(goorno-go)ineachofthesestages. The upper half of the figure delineates the activities and requirements of thetransferor (referred to as the "donor" by Bar-Zakay) and the lower half that of the transferee or the"recipient." The activities to be carried out are specified in detail in this model and the importance of boththe transferor and transferee acquiring skills to undertake technological forecasting, long-range planning,and gathering of project-related intelligence is emphasised.
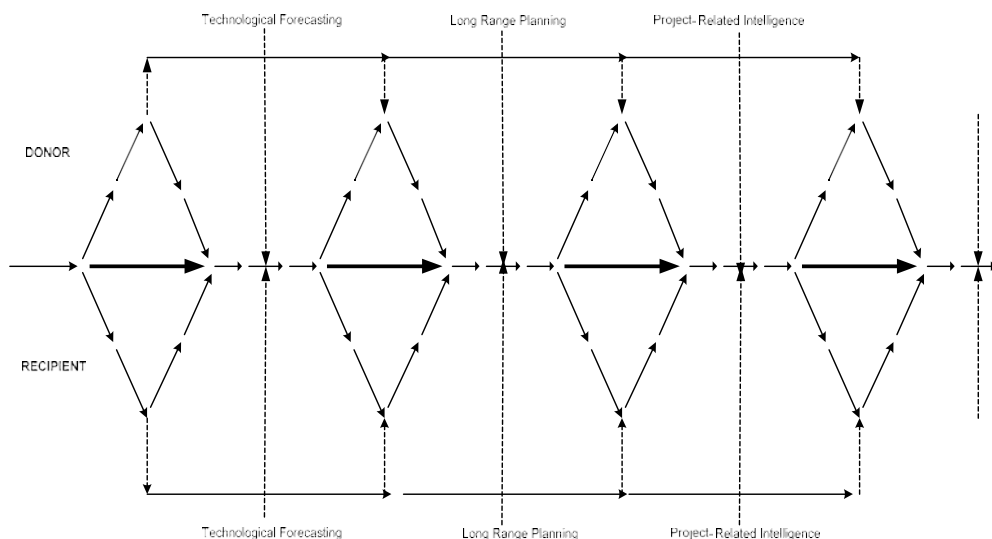
TheBar-Zakaymodeloftechnologytransfer: Jagoda (2007)

B. **The Behrman and Wallender Model:**Behrman and Wallender (1976) have proposed a seven stage-process for international technology transfer that may be more relevant to multinational corporations. Thesevenstagesare:

1. Manufacturingproposalandplanningtoarriveatdecisionsregardinglocationan

dpreparingabusinesscaseincludinggoodresourceassessments.

2. Decidingtheproductdesigntechnologiestobetransferred.
3. Specifyingdetailsoftheplanttobedesignedtoproducetheproductandotheraspects relatedtoconstructionandinfrastructure development.
4. Plantconstructionandproductionstart-up.
5. Adaptingtheprocessandproductifneededandstrengtheningproductionsystem stosuitlocalconditions.
6. Improvingtheproducttechnologytransferredusinglocalskills.
7. Providingexternalsupporttostrengthentherelationshipbetweenthetransferora ndtransferee.

C. *The Dahlman and Westphal Model:*Dahlman and Westphal (1981) carried out considerable work intheRepublicofKoreaand,basedontheirexperienceinrapidlyindustrialisingcoun triesduringthe1980s,intheFarEast,haveproposedaninestageprocessmodelasfollo ws:

1. Carryoutpre-investmentfeasibilitytogatherinformationandcarryoutatechno-economicanalysistoestablishproject viability.
2. Carryoutapreliminaryidentificationoftechnologiesneeded,basedonthefeasib ilitystudy.
3. Carry out basic engineering studies that involve the preparation of process flow diagrams, layouts,materialandenergybalancesandotherdesignspecificationsoftheplant andmachineryandthecoretechnology tobetransferred.
4. Carry out a detailed engineering study that involve the preparation of a detailed civil engineeringplan for the facility, including construction and installation specifications and identification of theperipheraltechnologyneededtomakethetransfereffective.
5. Carryouttheselectionofsuppliersforequipmentandsubcontractingservicestoa ssembletheplantandmachineryandplanfortheco-ordinationoftheworkamongvariousparties
6. Prepare and execute a training and education plan, in consultation with the suppliers of technology,fortheworkerswhowouldbeemployedinthetechnology transferproject.
7. Constructtheplant.
8. Commenceoperations.
9. Develop trouble-shooting skills and put in place arrangements to solve design and operationalproblemsastheyarise,especiallyduringtheearlyyearsofoperation.

D. *The Schlie, Radnor, and Wad Model:*Schlie *et al. (*1987) propose a simple, generic model thatdelineates seven elements that can influence the planning, implementation, and eventual success of any

TTproject.Thesesevenelementsarelistedbelow.

1. Thetransferor,whichistheentitysellingthetechnologytotherecipient.
2. Thetransferee,whichistheentitybuyingthetechnology.
3. Thetechnologythatisbeingtransferred.
4. Thetransfermechanismthathasbeenchosentotransferthechosentechnology.
5. The transferor environment which is the immediate set of conditions, in which the transferor isoperating. Attributes of the transferor environment that can influence the effectiveness of thetransferprocessinclude,amongothers,economicstatus,businessorientation (inwardversusoutward),stability,attitudeandcommitmenttothetransferprojec t,andoperatingpolicies.
6. The transferee environment which is the immediate set of conditions under which the transferee isoperating. Attributes of the transferee environment that can influence the absorptive capacity of thetransfereeincludephysicalandorganisationalinfrastructure,skillsavailabili ty,attitudeandcommitmenttothetransferproject,technologicalstatus,business orientation(inwardversusoutward),economicstatus,andstability.
7. Thegreaterenvironmentwhichisthatsurroundingboththetransferorandthetran sferee.Theremaybe layers of this environment that are sub-regional, regional, and global. Even if the immediateoperatingenvironmentsofthetransferorandthetransfereearefavour abletothetechnologytransfer,if the layers of the greater environment are not supportive, then cross-border and internationaltechnologytransfercouldbeadverselyaffected.Factorsinthegreat erenvironmentsuchaspoliticalrelationships between countries, exchange rates, investment climates, trade negotiations, balance oftrade, relative technological levels, and the status of intellectual property protection regimes couldhaveagreatinfluence onthesuccessof aTTproject.

The seven elements of this model are valid even in today's business setting. The way that they manifestthemselves can however change with time.

E. *TheChantramonklasriModel:*TheDahlmanandWestphalModelhasbeenfurtheri mprovedbyChantramonklasri(1990whoproposesafivephase model.

Thefivephasesofthismodelareasfollows:
1. Carryingoutapre-investmentandfeasibilitystudy
2. Developingengineeringspecificationsanddesignbasedonthefeasibilitystudy
3. Commencecapitalgoodsproductionbasedontheengineeringspecificationsand designsthathavebeendeveloped.
4. Commissioningandstart-uincludingcomprehensiveoftheworkforce

5. Commencecommercialproduction
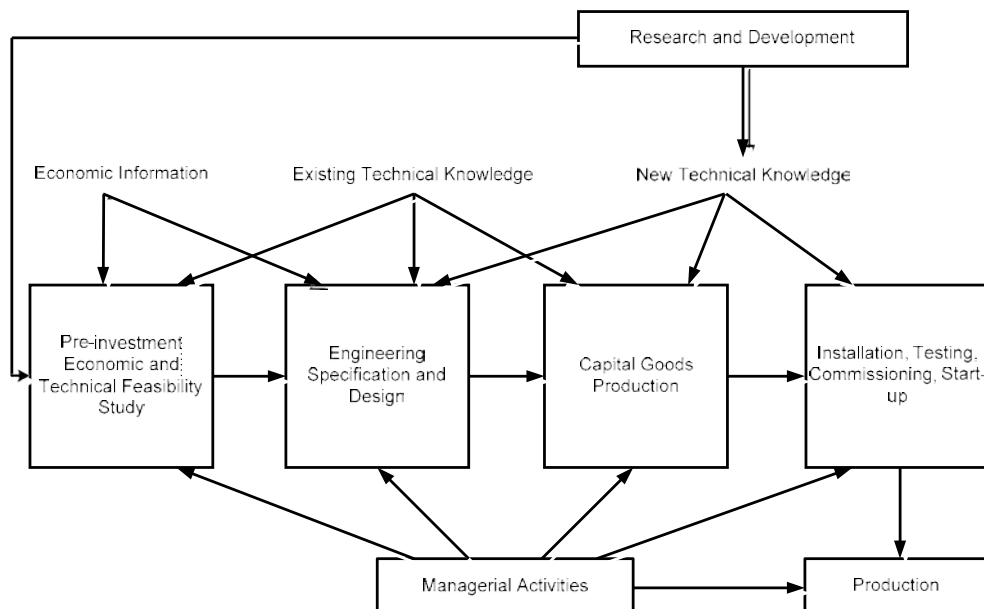
TheFive-phasemodelofinternationaltechnologytransfer;Source:Jagoda(2007)

F. TheAppropriability Model

This model, which was developed in 1945-1950s, suggests that good or quality   technologies sellthemselves(GibsonandSlimor,1991).Themodelemphasizesontheimportanceofqualit yofresearch, and competitive market pressure in achieving TT and promoting the use of research findings. According to this model,TT process simply occurs when technology has found users or has been discovered by the market.Purposive or deliberate TT mechanism is seen as unnecessary. This model assumes that after theresearchersdevelopthetechnologyandmaketechnologiesavailablethroughvariousfor msofcommunications such as technical reports and professional journals, the users will "automatically showupattheresearcher'sdoor".

G. The Dissemination Model

This model, which was popularized by Rogers (1983) and Rogers and Kincaid (1982), is developed inthe 1960-1970s. This approach suggests the importance of technology andinnovation to be diffused or disseminated to the potential users by the experts. This model assumes that an expert will transfer specialized knowledge to the willing user. Thepresumption underlying this model is that once the linkages are established, the new technology willmove from the expert to the non-expert "like water through a pipe once the channel is opened".

H. TheKnowledgeUtilizationModel

This model, which was developed in late 1980s, has a significant influenceonTTliterature.Theapproachtakenbythismodelisitsemphasison;

1. Role of interpersonal communication between the technology developers/researchersand technology users
2. Importance of organizational barriers or facilitators of TT. Theknowledge

utilization approach represents an evolutionary step which focuses on how to organizeknowledge to effective use in the technology users setting.

I. *The Communication Model*

This model perceives TT as "a communication and information flow processwith communication understood to be concerned with full exchange and sharing of meanings". Thismodel suggests technology as "an on-going process which involves a two-way interactive process(non-linear) by continuously and simultaneously exchanging ideas among the individuals involved".

This model assumes that there is "a body of information, of objective facts, just lying therewaiting to be communicated". The underlying presumption is that knowledge is anobjectthatexistsindependently,valid,completeandhasuniversalapplicability. The implementer (technology developer) is responsible for transferring knowledgecorrectly through the appropriate channels for the user to understand; and failure to adopt knowledge issimplybecausetheusersfailtounderstand.

J. *GibsonandSlimor'sModel*

This model describes TT from the perspective of technology researchers and users through three levelsof involvement. The underlying theories of this model are the organization and communication theories. This model proposes that TT consists of three levels of involvement: LevelI(TechnologyDevelopment),LevelII(TechnologyAcceptance),andLevelIII(Technology Application). This model explains the levels of technology transfer involvements and integrates theactivitiesinvolvedinthetraditionalmodels.TechnologyDevelopmentisconsideredasthemostimportant level where the transfer process is viewed as passive through transfer means such as researchreports, journal articles, and computer tapes. This level relates to the appropriability model: where theemphasis is on the importance of quality of research and competitive market pressure in achievingtechnologytransfer.

Capacity Building of Extension Personnel

Capacity Building can be defined as "activities which strengthen the knowledge, abilities, skills and behaviour of individuals and improve institutional structures and processes such that the organization can efficiently meet its mission and goals in a sustainable way. Training is one of the essential components of capacity building.

Training

Training in an organization is not meant for knowledge only but to put them into practice. Every training must contribute to better productivity. The emphasis is on application. Above all, training is directed at improvement of performance at work. Thus, training has an immediate concern to help learners apply new learning back at home.

Flippo (1966) described training is an act of increasing knowledge and skill of an employee.

Lynton and Pareek (1967) state that training consists largely of well-organized opportunities for participants to acquire necessary understanding and skills. Training aims at lasting improvement on the jobs.

ILO (1986) defined training as activities aimed to provide attitude, knowledge, and skills required for employment in a particular occupation for exercising a function in any field of activity.

Strayton (1986) defined training as acquisition and development of those knowledge, skills, techniques, attitude and experiences which enable an

Training V/S Education

S.No.	Training	Education
1.	Training is meant for those in the jobs or vocation	Education is mostly attended by fresh and inexperienced learners
2.	The learners are adult and from diverse background	Learners are similar in background and characteristics
3.	Training is generally organised for shorter duration and for specific purpose in view	Education is long term affair
4.	Training courses are planned on the basis of needs of the participants and thus are quite focussed and flexible in nature	Education is broad and catering to general needs of people. Curricula are rigid and take longer time to update and change
5.	Training aims to improve performance of people. Thus there is a sense of urgency about providing ability to use all that is taught during training	Education is mostly concerned with enhancing knowledge. Even though practical may be part of education, most of what is taught is seldom is put top practice

Teacher V/ S Trainer

S.No.	Teacher	Trainer
1.	Teacher works as experts. He seems to know all the things and learners are mostly ignorant	Trainer acts as co-learners. He is one among other knowledgeable and experienced people. Thus, he shares ideas, inspires and help them learn together
2.	Teacher as authority in the class and control the learners. He maintain the disciplines	Trainer is mostly non-interfering. He tries to create a positive learning climate in order to encourage learners to assume responsibility
3.	Teachers is generally use lectures	Trainers is generally use a variety of teaching methods to create interests and involvement of learners
4.	Teacher expects respect and obedience from learners	Trainer respects ability and experience of the learners
5.	Teachers inform plans of teaching and expects the learners follow	Trainers presents plan of training and invites comments from learners to make suitable changes

Features of Training

1. Training is planned and purposeful

    Training is systematic process consisting of three distinct phases viz, pre-training, training and post training phase. In term of step there are four steps in the process of training as given below:

    i.   Training needs assessments
    ii. Training programme developments
    iii. Training programme implementation
    iv. Training programme evaluation

2. Training is short term and intensive affair

3. Training is scientific process

4. Training is collaborative process

5. Training is continuous process

Phases of Training

1. Pre-training- Preparatory phase

- Specifying clear objectives of training and for the use of trained personnel
- Selecting suitable participants
- Building favourable expectation and motivation in participants
- Planning change in the organization related to project improvements in task performance

2. *Training phase- Implementation phase*
   - Communicating continuing interest and avoiding distraction

3. *Post-training- Follow up*
   - Support organizational adjustment
   - As participants back from training and needs to be encouraged to use the useful things he or she learned

Three Basic Phase in Learning (Kurt Lewin)

1. *Unfreezing*

   - Unfreezing is necessary because participants, and behind them their organizations, families and localities come to training already filled with ingrained habits of feeling, thought, and routine action, all of which reinforce each other. To influence them their through training, their normal habits have to be questioned and disturbed, or "unfrozen" early. Training can do this by focussing attention on needs that participants recognize but cannot satisfy by habitual behavior.

2. *Moving*

   - In this disturbed state trainer then introduce other event which allow participants to try new ways of behaving that is moving

3. *Refreezing*

   - If they find new behaviour more useful to meets the needs, participants can then be helped to make it habitual in time

> *Matthew B. Miles* conceptualize this process as a "change inducing temporary system"

Typology of Training
1. Pre-service training
2. Orientation training/Induction training
3. In-service training
4. In-house training
5. Out-door training
6. Conventional training
7. Experiential training
8. Participatory training
9. Co-training/Team training
10. Management development training
11. Sensitivity training/T group training
12. Grid training
13. On the job training
14. Farmers training

15. Extension personnel training
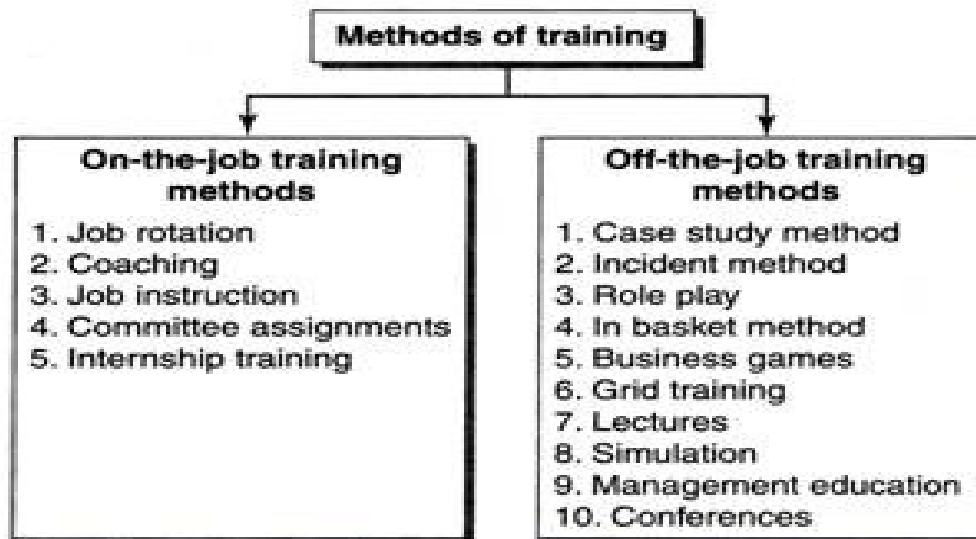
Training Needs Assessments

Training needs refers to those needs that concern performance of employees. Thus, an employee needs training if their is gap in his attitude, knowledge, understanding or skill related with work. Training needs assessment refers to the process whereby such training needs are identified, priorities, and selected for specific action as a part of training programme. The first step of training cycle is the identification of training needs.

Advantage of TNA

It is beneficial to assess training needs because needs assessment provide realistic data about participants' background and performance. It is easier to decide relevant contents, method, time-period and other aspects of training after needs assessment.

- The benchmark data can be used to compare with post training data to determine effectiveness of training.

- Both participants and trainer find training relevant and comfortable. Participants can see the relevance of training in their jobs where as trainers know rational behind their choice in designing and conducing the training course.

Approaches to TNA

1. *Individual level needs assessment*
   Identifying needs as ability gap i.e. deficiency between existing and desired level of knowledge, skill and attitude required by individual to perform a job

2. *Performance appraisal*
   The main purpose of performance appraisal is to locate any shortcomings in the performance of appraisees based on their actual job performance. Best

appraisal would include the full knowledge and participation of the appraisee. It may done through examination of work sample, observation etc.

3. *Task analysis*

Just as a job consists of various tasks, so does a task comprise of a number of step or components. As in case of job analysis fail to yield sufficient insights into nature of activity covered under a given job, it may be necessary to take the analysis further to analyse each task. A study of these tasks, known as task analysis, enable trainer to develop a fuller understanding of the detailed activities covered by a job and to determine, at more detailed revel, the desirable training of training programme. This requires;

- Breaking down each task into its constitutes elements (step/components)
- Assessing these steps on the basis of aforementioned criteria of frequency of occurrence, relative importance and envisages learning difficulties
- It directed at determining which step should be given more emphasis or exposure in the course training.

4. *Gap analysis*

- In this step you will determine if there is a gap between what perspective trainees know, and what they need to know to function effectively in their jobs.
- If there is difference between what is and what should be, you must analyse this gap and determine if training will solve the problem.
- Hence, it will be more efficient to increase the time available for teaching others skills in which trainees are not as competent and which have a better chance of being used later.

Methods for Assessing Training Needs
1. Key informants approach
2. Interviewing
   a. Structured interviews or Questionnaire
   b. Unstructured interviews
   c. Semi-structured interviews
   d. Group and individual interviews
3. Observation method
4. Unobtrusive observation-not realised as they are being observed
5. Unfocussed observation
6. Focussed observation
   a. Non-participatory observation (external observation)
   b. Participants observation (internal observation)
   c. Observation of people in experimental situation
7. Case study
8. Focussed group interviews- 10-12 people

Human Resource Development

Concept of Human Resource Development (HRD)

Term HRD was first used coined in George Washington University in USA. It was later used in the conference of American Society for Training and Development at Miami, USA IN 1969.

The objective of HRD is to make an individual realize his importance in the organization and to provide ample opportunity to function effectively. Thus, is the empowerment of the individual. HRD call for creation of systems and activities in an organization to enable employees to work with motivation, responsibility and develop fully.

> ### Definition
>
> *Rao (1992) explained that HRD is a process in which employees of an organization are continuously helped in planned manner to acquire and sharpen capabilities that are required to performed various function.*
>
> *Nadler (1994) defined HRD as a planned and continuous effort by management to improve employee's capacity levels and organizational performance through training, education and develop programmes. Training includes those activities that are conducted to improve overall competence of an individual in a specific present or future jobs.*

Training and HRD in Extension

Proper planning and management of human resources wit in extension organization is essential to increase the capabilities, motivation and overall effectiveness of extension personnel. In order to catalyze self-reliant approach to sustainable agriculture, extension personnel of different levels also needs training to become sensitive about varying needs of farmers.

Content areas for Training

The Extension Committee on Policy as necessary for effectiveness of Extension agents in USA identified 8 broader areas of training;
1. Extension organization and administration
2. Programme planning and development
3. Communication
4. Research
5. Human development
6. Educational processes
7. Social process
8. Effective thinking

Core Extension personnel of developing countries

- VEW
- SMS
- Supervisory staff or Extension officer

Rolling (1988) elaborated HRD approach at the gross-root in term of five function

- Mobilization of people
- Organization
- Technical support
- Training
- System management

New Areas of Training

- Training in new agricultural technologies
- Training in sustainable agriculture
- Training for strengthening farmers capacity for self development
- Training for youth and farm women

Infrastructure for Extension Training

At national level, Directorate of Extension, MoA & Co, GoI is involved in planning in training courses in consultation with state agricultural universities, national institutes, ICAR institutes, State department of agriculture and other concerned institutions. A network of training institution has come up with national, regional, state, divisional, district and block level.

1. **MANAGE, Hyderabad**-training of senior extension personnel in research extension linkage, monitoring and evaluation

2. **SAUs**-training of middle level extension personnel through national training course

3. **ACTs**- middle and senior level extension personnel

4. **EEI**-meant for imparting training to middle level extension personnel in extension education concepts and method, communication media and training methodology

5. **SIRD-** State Institute of Rural Development

6. **FTCs (1960s)-** were meant to be the gross-root training institutions to train farmers in the knowledge and skills about new agricultural technologies

7. **KVKs**- gross-root training institution to impart need-based, skill-oriented systematic training to farmers, farm youth, farm women and gross-root extension functionaries.

Extension Teaching Methods

A method is a way of doing something, an orderly arrangement of a set of procedure.

> "Extension teaching method s are devices used to create situations in which communication can take place between an instructor and the learners. The basic objective of extension teaching method is to create an opportunity for effective learning in order to secure changes in the minds and action of the learners."
>
> *Leagans (1960)*

Classification of Extension Teaching Method

According to Use (Wilson & Gallup, 1955)

Individual Contact Method	Group Contact Method	Mass Contact Method
- Farm & Home visit - Personal letters - Office call - Flag method - Agricultural clinic	- Group meeting - Method demonstration - Result demonstration - Conducted tour - Training camps, Crop school - Peripatetic team meeting - Media forum - Agricultural games	**a. Broadcast media** - Radio and recordings - Educational television **b. Printed media** - Farm journal - Extension pamphlets - Bulletin, Leaflets - Circular letters **c. Screen media** - Slide, Film, Stripes, - Movies, Video recordings **d. Others** - Exhibition - Campaign - Farmers fairs

According to Form(Wilson & Gallup, 1955)

Written	Spoken	Visual	A-V or Spoken and Visual
- Bulletin - Leaflets - Personal letters - Circular letters - Farm journal	- Meeting - Farm and Home visit - Office call - Radio & Recordings - Flag method - Agricultural clinic	- Result demonstration - Exhibition - Poster - Chart - Slides, Film stripes - Flash cards - Flannel graph - Bulletin boards	- Method demonstration - Result demonstration - Television - Movies - Puppets - Campaign

Classification of Audio-Visual Aids

According to Evolution

1) **First generation media-** Hand-made chart, Graph, Exhibits, Model, Hand written material etc.

2) **Second generation media-** Printed/Illustrated text, Printed graphics, Workbook etc.

3) **Third generation media-** Photograph, Slides, Film strips, Film recording, Radio, Tele-lecture etc.

4) **Fourth generation media-** Television, Programmed instruction, Language laboratories, Electrical digital computers etc.

According to Senses involved

Audio Aids	Visual Aids		Audio-Visual Aids
- Radio talk - Tape recording - Disk recording	**Two-dimensional visual** **a. Projected** - Films - Slides - Film strips - Opaque material - Overhead transparencies **b. Non-projected Presentation** - Flash card - Flannel graph - Charts - Flip book - Maps	**Three-dimensional visual** - Models - Specimens and Sample - Mock-ups - Puppets - 3-D films	- Motion picture - Telecasts - Video recordings - Sound synchronised slides - Radio-vision

c. Display - Bulletin boards - Photograph - Posters - Wall chart - Exhibits **d. Literature** - Illustrated - Leaflets - Comics			

According to contribution to Learning- Dale (1965)

from maximum to minimum as we go downward

1. Direct purposeful experience
2. Contrived experience
3. Dramatised experience
4. Demonstration
5. Field trips
6. Television
7. Motion pictures
8. Recording, radio, still picture
9. Visual symbols
10. Verbal symbols

ICT Application in Transfer of Technology

ICT (New and Social Media)

CSO (2010) defines ICT not as an individual item like the internet or computers, or telecommunications but as a convergence of different electronic tools that facilitate the functions of information processing and communication, including transmission and display.

Michiels and Van Crowder (2001) have defined ICTs 'as a range of electronic technologies which, when converged in new configurations, are flexible, adaptable, enabling and capable of transforming organizations and redefining social relations'. The range of technologies is increasing all the time and 'there is a convergence between the new technologies and conventional media'.

Need of ICT in Agriculture Extension or /Agriculture

1. To accelerate agricultural growth
2. To expand knowledge resource
3. To facilitate better information services
4. To supplement inadequate technical man power
5. For stronger research-extension clients system linkage
6. To develop essential feedback mechanism
7. For cost effective extension delivery
8. To develop knowledge managers
9. To ensure gender equity in technology transfer process
10. To empower small and marginal farmers
11. To serve farm stakeholder beyond technology transfer role

Catalytic Role or Importance of ICT

1. Decision making process
2. Advisory services
3. Market outlook
4. Empowering rural community
5. Multisectoral services
6. Targeting marginal groups
7. Creating employment opportunities
8. Maintenance of land holding records
9. Triggering knowledge revolution

Advantage of ICT

1. The online services can be provided through the ICT for information, education and training, and consultation, diagnosis, monitoring and finally transaction and processing.
2. E-commerce can be effectively used for linking the local commercial and production activities directly to retailers and trade purchases and to suppliers.

3. ICT can provide a question and answer services where expert respond to queries on specialized subjects.
4. Provision of ICT services on to the block level and district level development officials lead to efficiency in delivering the services for overall agricultural development.
5. It helps in providing up-to-date information services to the farmers, such as a package of information, market information, weather forecasting, input supply, credit availability etc. can be provided at the earliest possible times.
6. It helps in creation of data base of local resources in villages and the villagers, site specific information system, expert system etc.
7. It also helps in providing information services on disease/early pest warning system, information regarding rural development programme, crop insurance and post-harvest technology.
8. Facilitation of land records and online registration services can be realized using the ICT.
9. Improving the marketing of milk and milk product is another area where ICT can be used.
10. ICT can be extended services regarding farm business and management information to the farmers.
11. Increase the efficiency and productivity of cooperative societies can be possible with computer communication network and latest data based technology.
12. Providing tele-education to the farmers is another area where ICT can be effectively used.
13. The agricultural research institutes findings can be made available to the extension worker. These institutes can also get the first hand information from gross root extension worker.

Scope of ICT

1. It will promote rural business
2. Maintain priority between rural and urban areas
3. Facilitate diversification of economic activity in rural areas
4. Dissemination of farm information
5. E-governance at gross-root level
6. Sustainable management of natural resources
7. Enhance quality of life in rural areas

Limitations of IT

1. Poor telecommunication system, with very less telephone line in rural areas.
2. Insufficient power supply in the villages causing serious interruption in data transmission.
3. Less service providers like internet service provider, technical and software expertise and hardware engineers, thus resulting in higher cost, delay and less access to these services.

4. Low purchasing power of people
5. Low literacy rate in rural areas in comparison to urban areas.
6. Limited and insufficient coverage of issues related to rural areas by radio and television service providers.
7. Gender sensitivity in accessing different needs and preferences through ICT
8. Slow service responses to telephone problems.
9. Slow connectivity in case of internet.
10. Less awareness about net Information and Communication Technologies in rural areas.
11. Poor maintenance of Information Communication Technologies.
12. High telecommunication cost remain remains a strong deterrent in accessing information through internet.
13. Lacking policies and strategies that facilitate the harnessing of new ICT for rural development.
14. Inadequate infrastructure facilities for utilizing the new ICT services for strengthening the rural socio-economic condition.

15. Inadequate human resources like training and capacity building for effectively harnessing ICT in rural areas.

Social media and its role in Extension Education

Social media

Socialmediareferstothemeansofinteractionsamongpeopleinwhichtheycreate,share,consumeandexchangeinformationandideasinvirtualcommunitiesandnetworks.Socialmediaasagroupof Internet-basedapplicationsthatbuildontheideologicalandtechnologicalfoundationsofWeb2.0and thatallowthecreationandexchangeofuser-generatedcontent.Ithaschangedthewaywecommunicate,read,search,think,talk,watch,listen,andsometimesstartarevolution,beitpoliticalandorsocial. It takes on many different forms includingmagazines, internet forums, weblogs, social blogs,micro-blogging,wikis,podcasts,photographsorpictures,video,ratingandsocialbookmarking.This form of communication can be with a person or agroupofpersons.Today,mostofthepeoplespeciallythe youngsters are hooked on to the different socialmediaforkeepingincontactwiththeirpeers.

Philosophyandprinciplesforuseof social networksinextensioneducation

The basic philosophy of social media is thedemocratizationofinformation,communicationandknowledge management. The following principlesforusingsocialmediaforextensioneducationshouldbeconsidered:

1. Involveandengageeveryclientandstakeholdertoachievesustainedcommunicationprocesses.
2. Organizationalpolicyonsocialmediaforsharingpersonnelandprofessionalinformation.
3. Includebroad-basedinformationondifferentproblems.
4. Subjecttochange.
5. Gatekeepingonirrelevantorrepetitiveinformation.
6. Facilitatingtheinteractionamongallstakeholders.

Social media for agricultural extension in developing countries

Socialmediausehasgainedpaceinthedevelopingcountriestoo,especiallywithFacebook.All these examples presented below are initiated byindividuals,smallgroupsandnetworkstodisseminateinformationbyandforagricultural stakeholders through social media. The number offollowers/membersofthesepages,communitiesandgroups are increasing every day and many of themareprofessionals.Someexamplesaregiveninbelow:

Social media tools in Extension Education

Facebook

MarkZuckerbergwasthefounderofFacebookanditwasstartedinFebruary4,2004.Itprovidesuserswithaninteractivewebpagelikeformattoshareinformation,photos,articles, andweblinks.Extensioneducatorsmayfinditusefulto communicateinformationregardingupcomingevents,celebrations,informationalpieces,a

nd publications. It is a great place to start a positiveconversation about agriculture extension, connectwiththeyoungergeneration,andgetpeopleexcitedaboutfarming.Extensioneducat orcancreatecustom list of learner and manage groups of learneroncustom topics related to courses. Online chatcanbeusedfordirectcommunicationbetweenstudentandteachers.Informationontests ,examsorfacetofacemeetings,ongoingeventorprogramme, etc. can be posted on facebook. It alsoservesasane-Learningplatformalongwithposting photos, activities and demonstration videosfrom the farm and sharing agricultural messages.Farmfactscanbesharedonone'spageby connecting with agriculture pages.

Name of thegroup/Community/Pages	Description	Targetusers	Region	Followers/Member
LivestockInformationand MarketingCentre (https://www.facebook.com/groups/Livestock.TN)	Information related tolivestock production,marketingetc.isshared	Agricultural stakeholders related tolivestock	Tamil Nadu, India	49483
Natural Farming Development Centre (http://www.facebook.com/groups/NaturalFarmingTN/)	Information related to organic farming, perm culture, hydroponics, aquaponics, Natural repellent, etc. is shared	Turmericfarmers	India	2911
National EcologicalProducers Association(https://www.facebook.com/anpe.peru)	Information related toecologicalfarming issharedthroughthepage	Farmers	Peru	3061
Agricultural Extension inSouth Asia (AESA)(https://www.facebook.com/groups/428431183848161/)	Member post links to relevantpublications on extension andadvisoryservices	Agricultural ExtensionStakeholders	SouthAsia	7550
GlobalForumforRuralAdvisory Services(GFRAS) (https://www.facebook.com/groups/gfras/)	Thispageprovideinformationrelated to advocacy andleadership on pluralisticdemand driven rural advisoryservices	RAS Professional andothers	Global	1749

WhatsApp Messenger Group

WhatsAppMessenger Group: WhatsApp Inc. was founded in2009byBrianActonandJanKoum,whowerebothformeremployeesofYahoo!.Itisapropr

ietarycross-plat form instant messaging client for smart phonesthat operates under a subscription business model.WhatsAppInc.basedinMountainView,California,was acquired by Facebook Inc. on February 19,2014,forapproximatelyUS$16billion.Inextensioneducation it can be utilized to send text messages,images,video,userlocationandaudiomediamessages related to agriculture to other users usingstandardcellularmobilenumbers.

YouTube

YouTube was founded by Chad Hurley,Steve Chen, and Jawed Karim, who were all earlyemployeesofPayPal.YouTube'scurrentheadquarters in San Bruno, California. The domainname"YouTube.com"wasactivatedonFebruary14,2005. YouTube's popularity makes it an attractivetoolforextensionduetoitsviralnature,easeofuse,and accessibility by audiences of all ages. It can beusedtotriggerinteresting anduniquediscussion on educationalvideos.Highqualityeducationalinstruction videos, short clips from documentaries,experimentdemonstrations,etcareavailableforfree. Play lists can be created to help with futurelessonplanningandshareamongstone'sdepartment.Also,videoinfo-graphicscanbeusedasacompellingwaytointroducealotofinformationinashortamountofti me.

Twitter

Itisamicro-bloggingplatform,foundedbyJack Dorsey and started in March 21, 2006 that letusersbroadcastshortmessages(calledtweets)ofupto140characterstotheirfollowers.Itn otonlyhelpsin tracking news about books, journals or treatiesavailable in the libraries of educational institutionsbut also helps in rapid spread of information aboutscheduledfacetofacemeetings,exams,orseminars.It facilitates the solving of specific problems whichmaybeeasilysolvedinagroupanditsdissemination.Shortmessagesof140characters offer a high degree of conciseness and develop theabilityofteachersandstudentstocommunicateinamore efficient way which also includes providingfeedbacktoteachers.

Blogs

Ablog(derived fromthe word web+log)isan online journal where an individual, group, orcorporationpresentsarecordofactivities,thoughts,orbeliefs.Therearemanywebsitestha tallowuserstocreateblogswithoutpayinganyfeelikeWordpress.com,Blogspot.com,andbl ogger.com.Blogsareamethodofsharingexpertiseandinformationviacommentaryanddes criptionofevents.Bloggersvaryfromprofessionalstolaypeoplewhoshareinformationand weblinks.Consumersusereliableblogsitesforproductreviewsandcommentary.Becausebl ogscanbeestablished by anyone, it is crucial for extensioneducatorstoestablishapositivereputationandcommunityfollowing.

LinkedIn

LinkedIn is a business-oriented socialnetworking service founded by Reid Hoffman inDecember2002andlaunchedonMay5,2003.Usersmaintainalistofcontactdetailsofpeoplewithwhomtheyhavesomelevelofrelationship,calledconnections.Thelistsofconnectionscanbeusedtobuildupacontactnetwork,followdifferentcompaniesandfindjobs,peopleandbusinessopportunities. It helps in forming group forums fordiscussion,Joblistings,onlinerecruiting,andactasapublishingplatform.

Pinterest

Pinterest, launched in 2010, is a socialnetwork that allows users to visually share, create,and discover new interests by posting, also knownas'pinning,'imagesorvideostotheirownorothers'pin boards. Users can either upload images fromtheir computer or pin things they find on the webusing the Pinterestbook mark let, Pin It button, orjustaURL.Itisauniquewayandextensioneducator can utilize this social network to sharestorythroughpictures.

Flickr

Flickr owned by Yahoois a very popularphoto sharing sites with robust functionality nativetodesktopcomputers,viabrowseranddesktopapplication. Flickr allow users to share and embedpersonalphotographs,creatinganonlinecommunitywhorespondandshareeachotherimages.ItenablessearchingusingthetoolswithinandoutsideFlickr.

MySpace

It was founded by Chris De Wolfe andTom Anderson and launched on August 15, 2003.Memberscanuploadmultiplepicturesofthemselvesto show the world the face behind the profile. TheycanusethisareaoftheprofiletosendmessagesandIMs, add people to their friends list, or to shareprofileswithotherfriends.

What Is a Media Mix?

A media mix is the combination of communication channels which can deliver message or information effectively and efficiently. Typically, these include newspapers, method demonstration, result demonstration, poster, Flashcard, radio, television, billboards, websites, email, direct mail, the Internet and social media, such as Facebook or Twitter. Combining these channels in a media mix enables to communicate in the most effective way with different type of farmer categories and prospects at different stages of the adoption of agriculture innovation.

Right Message to the Right Audience

An effective media mix delivers the right message to audience and prospects at the lowest cost and with minimal waste. If you want to reach an audience across the country, you might use a media mix that includes national newspapers, radio or television. If you wanted to reach a specific group of business decision-makers, such as technical directors, your mix might include specialist business magazines or exhibitions aimed at those directors. To reach a small number of key executives who influence a major purchasing decision, you might include personalized direct mail or an executive briefing session in your mix.

Aligning Media Mix with adoption Stages

Innovator or progressive farmer notes that the emphasis in the media mix changes at different stages in the adoption process. When prospects are looking for awareness information, they may read publications covering their interests, search websites, listen radio, TV, visit trade shows or check product review sites. So, it's important that you have information in the places they are likely to visit. The emphasis in your media mix would be on raising awareness through advertisements, press releases, and product pages on your website, participation in trade shows or comments on social media. When prospects have expressed an interest in your products, you can use a different media mix to nurture them and move them toward adoption.

Integrated Media Work Harder

The components of a media mix are more effective when they are integrated. The benefit of an integrated campaign is that the media mix is more effective when the components work together and communicate consistent messages each time.

Fine-Tuning the Mix

Analytical tools are available to assess your media mix and improve the results you achieve. These tools identify the strengths and weaknesses of your media mix. By demonstrating how changes in the mix can affect results, the tools help you to reallocate your budgets and create a better mix to improve performance.

Example of media mix use for various purposes has been given below:

Several studies on different media-mix for effective agricultural and rural development strategy have shown the following results :

i) The audio-visual aids are effective in disemination and transfer of improved practices. However, care should be taken to select appropriate aid according to educational activities. The following gives the effective media-mix for the different purposes of communication with regard to adoption of improved farm practices :

Purposes of Communication	Effective media-mix
Increase in knowledge and awareness	Radio + posters + publication (booklet, folders)
Improvement of skill	Method demonstration + flash cards + models
Change of attitude	Slides + information folders + photographs.
Change of behaviour to accept improved practices	Result demonstration + Field trips + slides + booklet

ii) About the effectiveness of Media-mix, studies have pointed out the following combinations as most effective for communication under various circumstances (Singh, Y.P. 1990) :

   a)   Printed material + group discussion

   b)   Slides + audio tapes

   c)   Flash chards + lecture

   d)   Television + discussion

   e)   Field trip + slide show.

With regard to three media combination the following mix was found to be most effective (Singh, Y.P. 1990):

   a)   Radio + slide show + field trip

   b)   Leaflet + individual contact + group discussion

   c)   Demonstration + individual contact + field visit

   d)   Field trip + demonstration + film

   e)   Individual contact + booklet + demonstration

Meaning and Nature of Communication

Communication Latin word 'Communis' meaning 'common'.

According to ***Leagans (1961)*** Communication is the process by which two or more people exchange idea, facts, feelings, or impression in way that each gains a common understanding of message, intent and use of message.

Nature of Communication

1. Communication is a process
2. Communication employs many means
3. Communication involve interdependence
4. Communication process comprises a number of distinguishable element like expression, interpretation and response
5. Communication takes place within participants
6. Communication takes place at many level
7. Fidelity varies from one communication situation to another

Purpose of Communication

1. Prime goal of communication is persuasion, an appeal to soul
2. Informative, an appeal to mind
3. Entertainment
4. Immediate and delayed rewards- Schram (1964)
5. Consummatory and instrumental- Festinger (1957)
6. Sole purpose of communication is influence- Berlo (1960) "**behavioural centred**"

Level of Communication

According to ***Thayer (1968)***

1. Intrapersonal communication- within one-self
2. Interpersonal communication- face to face
3. Organizational communication- highly structured, system of organizational communication
   a. The operational communication system- task related activities
   b. The regulatory communication system- order, rule, regulation etc.
   c. The maintenance and development of communication system- feedback oriented
4. Inter-organizational communication

Communication Theories and Model

Models are symbolic representation of structures, object or operation. Model are structural or process oriented.

The Three Types of Communication Models are:

1. *Linear Models of Communication*

   The linear model of communication is a one-way interaction where feedback is not present. Linear is the primary communication model; whereas, the transactional model is formed based on the linear model. The sender communicates with the receiver without receiving feedback. It also represents the one-way process of communication. Example of linear models of communication is given below;

Communication Models	Year
Aristotle Model of Communication.	384-322BC
Lasswell's Model of Communication.	1948
Shannon-Weaver Model of Communication.	1949
Berlo's SMCR Model of Communication.	1960

2. *Interactive Models of Communication*

   The interactive model of communication refers to the two-way method of communication with feedback. However, feedback is not simultaneous, so it provides slow and indirect feedback. Sometimes, the communication can be linear if receivers do not reply to senders. The interactive model of communication indicates mediated and internet-based communication. Example of interactive model of communication is given below;

Communication Models	Year
Osgood-Schramm Model of Communication	1954
Westley and Maclean Model of Communication	1957

3. *Transactional Models of Communication*

   The transitional model of communication seems like a two-way process of communication with immediate feedback. Simultaneous feedback is the essential component of the transitional models of communication. So, the communication process will not become transactional if there is no feedback. The feedback is direct and very fast. The receiver is compelled to provide instant feedback. The major difference between the interactive and transactional models is indirect and direct feedback. Example of transactional model of communication is given below;

Communication Models	Year
Eugene White's Model of Communication	1960
Dance's Helical Model of Communication	1967
Barnlund's Transactional Model	1970

Different Communication Models

1. *Aristotle Model of Communication*

    (384 to 322 B.C., Rhetoric) first basic persuasive model of communication

Speaker	→	Speech	→	Audiance

    - Invention
    - Organization
    - Language
    - Memory
    - Delivery
    - One way, linear

2. *Lasswell's Communication Sequence*

    (1948, Rudimentary model of communication)

Who?	Says What?	In Which Channel?	To Whom?	With What Effect?
Communicator	Message/ Information	Media/ Channel	Audience/ Receiver	Effect/ To be informed
Control Analysis	Content Analysis	Media Analysis	Audience Analysis	Effect Analysis
News Reporter	Negative Impact of Social Media	DD News	Public	Aware People
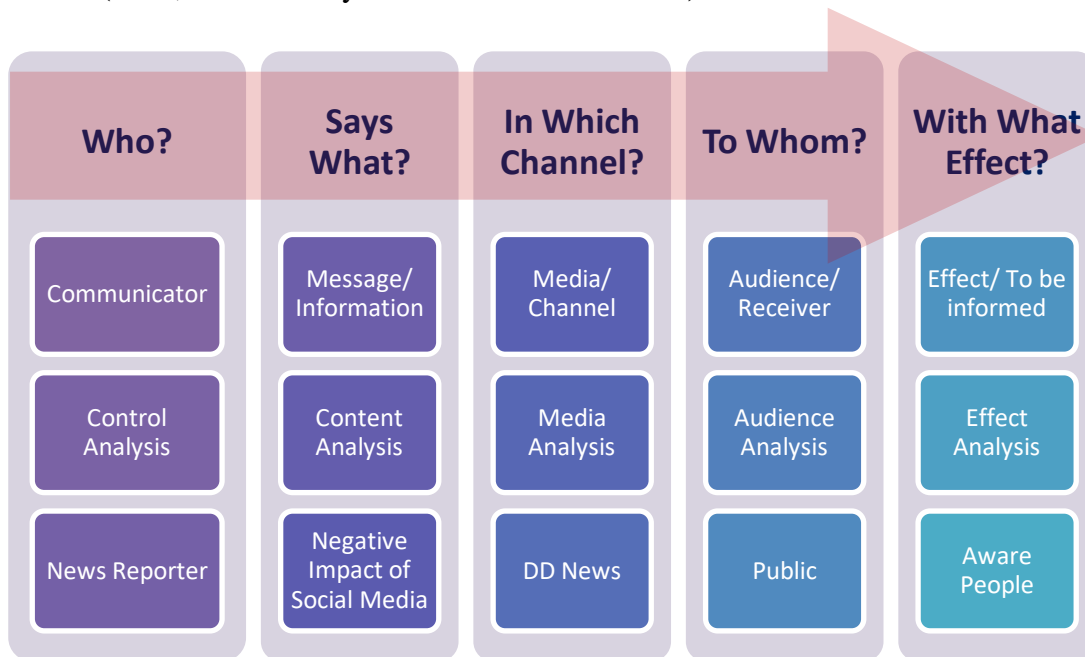
    - Simple, linear, one-way model of communication
    - Help to probe in to political communication, propaganda and political symbolism

3. *Stimulus Response Model of Communication*

    Interpersonal communication

4. Schramm Model of Communication (1948)

Schramm, W. (1954). Procedures and Effects of Mass Communication, in *Mass Media and Education*, ed. Nelson G. Henry (Chicago: University of Chicago Press.
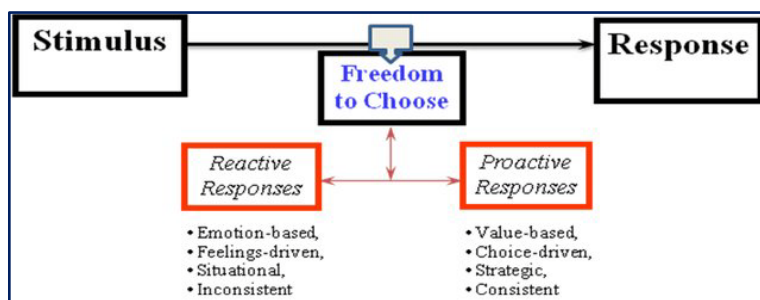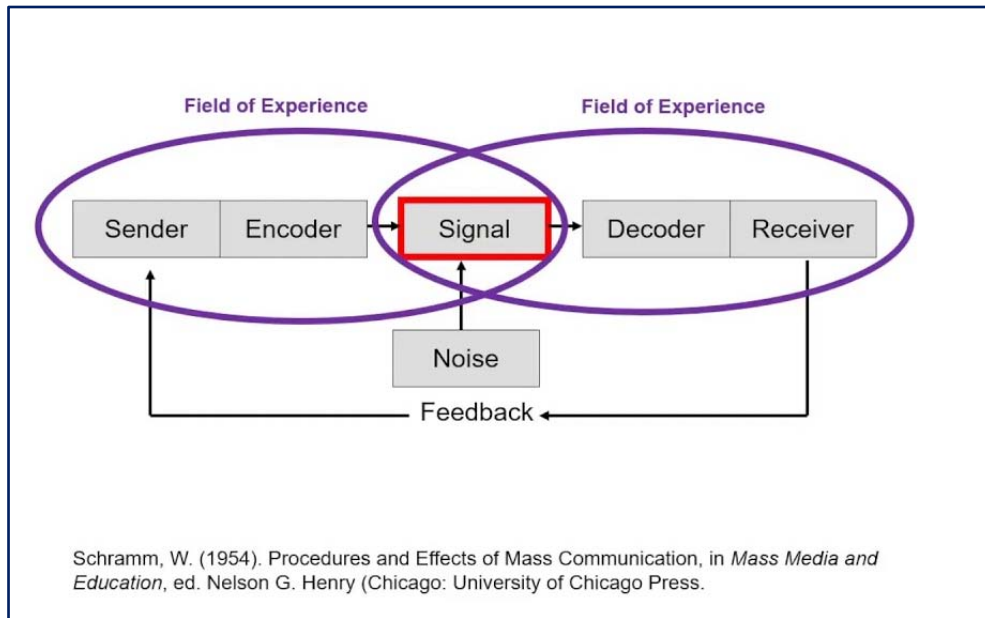
- Accumulated field experience of both the source-encoder and receiver-decoder must be common for achieving maximum output
- Each person in communication process is both encoder and decoder
- Emphasis on organic nature of communication and continuous process

5. Shannon & Weaver's Mathematical Theory of Communication
Suitable for electronic media
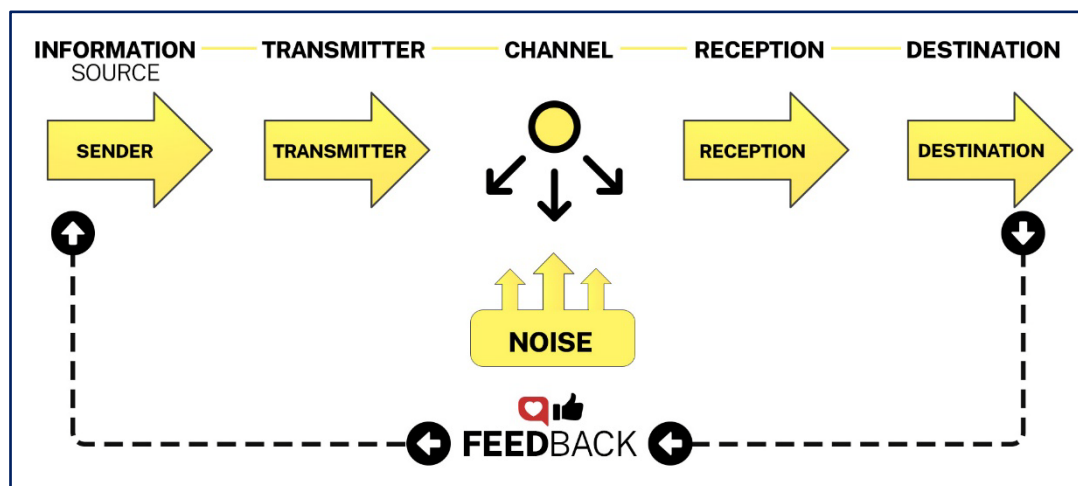
- "Information Theory" in 1940
- "Mathematical theory of Communication" in 1949
- Three level of problems
  - *Technical problems*- relate to accuracy of transference of information from sender to receiver.
  - *Semantic problems*- related to interpretation of meaning by receiver as intended meaning of sender

- *Problems of influence or effectiveness*- concerned with success to which meaning conveyed to receiver lead to desired behaviour on his part.
- **Information-** relate to what could be said and not what is said
- Amount of information is measured in term of **log** 2 and unit of information is called **BIT** which is acronym to **binary digit**
- **Entropy**- information can be measured by entropy which is a measure of degree of randomness or choices or once degree of freedom of choice to select a message. The ratio of the actual to maximum entropy is called relative entropy
- **Redundancy-**the amount of information that could be omitted or added in a noiseless channel, so that the message would still retain information or meaning.
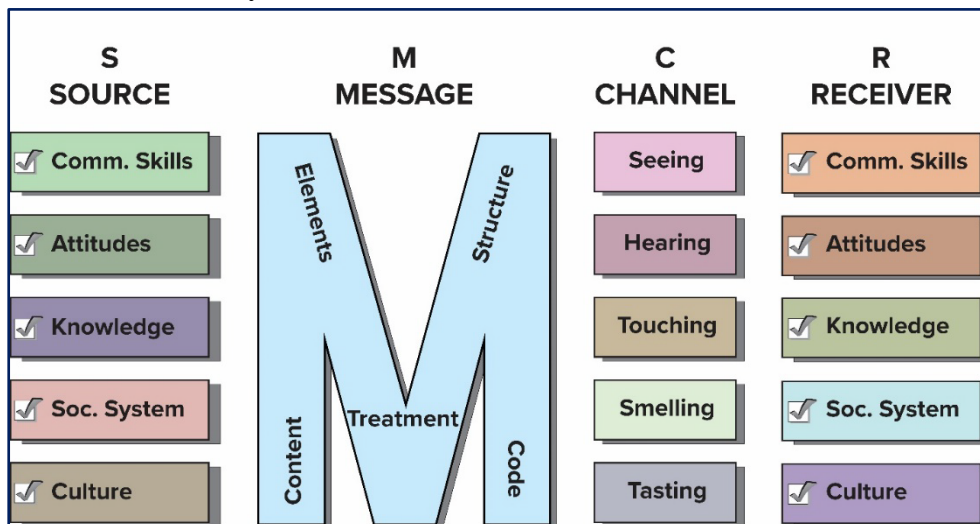- **Channel capacity-** the amount of information that can be transmitted per unit of time.
- **Coupling-** any system that couples two other system is called a gate keeper.

6. *Berlo's Model of Communication (1960)*
   - Most widely used and based on behavioural theory and research
   - Linear, one-way model of communication

7. *Leagans Model of Communication (1961)*
   - Communicator
   - Message or Content
   - Channel of communication
   - Treatment of message
   - Audience
   - Audience response (concept of feedback**)**

8. *Hovland Persuasion Model (1964)*
   - Following Aristotle designed persuasion model of communication which is **Receiver-Listener-Oriented**

- Hovland primarily interested in **predicting attitudinal change**

9. *Westley and MacLean Mass Media Model (1957)*

- Developed a four stage model of from **earlier model of Newcomb (1953).**

10. *Riley and Riley Model (1969)*

- Attention of **social context or sociologically oriented** in which communication (**mass**) took place

- This model fit together the many messages and the manifold individual reaction to them, with in an integrated social structure and processes.

11. *Gerbner's Model (1960)*

- Gerbners model primarily concerned with **'perception and production of messages'.**

- **Verbal form**

- According to this modelhuman communication systems are **'open system'**

- *McQuail & Windahl (1981)* view this model as subjective, selective, variable and unpredictable.

- Gerbners first interest lay in **perceptual dimension**, communicator's viewpoint, his r/s b/w himself and statement he makes.

12. *Linguistic theory of communication- spoken language*

- Word are linear, one dimensional when printed, meaning are in people, not in word.

- Syntax has utility in that it communicates **structural relationship** among word.

- When we emphasize denotative meaning and careful structure, we can be more accurate.

- When we emphasize connotative meaning, fidelity decreases but readability and interest increases

- Theory of man system

- Message in mind **-** message in linguistic form **-** message in physical symbols **-** message transmission - interpretation of physical symbols - response to the message

- *Williams (1975)proposed two dimension of this theory-*

    i. **Psycholinguistic theory-** focuses attention on the behaviour of an individual in the use of language.

    ii. **Sociolinguistic theory- the** r/s b/w variation in language usage and the personal and contextual circumstances of usage comes with in realm of sociolinguistics.

Barrier to Communication

Any obstacle or problem in the process of Communication which hinders/obstructs the process of Communication is called Barrier.' Barriers are part of process of Communication. Whenever we are communicating we encode and decode. We use various channels for passing messages. At any level or at any moment or stage there can be problems in communication process. Sometimes the sender may not use proper language that the receiver will understand. Receiver may not be able to Decode properly. There can be lot of noise in the surrounding which can disturb us. It rarely happens that barriers do not arise in the communication process. Many times barriers arise in the minds of the sender and receiver. The intended messages are not sent to the receivers.

Types of Barriers

We face many barriers while communicating. These barriers can create obstacles in the communication process. These barriers are classified into the following types;

1. **Physical or Environmental Barriers**

   The Barriers in the surrounding or in the environment are the physical barriers. Physical barrier may noise, defects in communication system and wrong selection of medium.

2. **Language/Semantic or Linguistic Barriers**

   Barriers arising due to the different language or differences in language can create problems in communication. Semantic Barriers means the problems arising because of the different meanings of the words.

3. **Psychological Barriers**

   Barriers or problems arising due to the stress or psychological problems are psychological barriers. It is difficult to accept and overcome these barriers.

4. **Socio-Cultural Barriers**

   Psyche means mind. Psychological barriers arise in the minds. Human mind it very complex thing to understand. We face many times some conflicts due to situations or surrounding events. So these barriers are bound to arise. But the real problem is that people do not accept that these barriers exists in their minds. Due to status, old age and ego problems many times psychological barriers are created. These are difficult to overcome. Because people do not accept that they face barriers or they lack proper understanding to face the world.

Agricultural Journalism

Agricultural journalism is of recent origin in India. It is now gaining importance, particularly after the establishment of agricultural universities in India. Technical information needs to be provided to the farmers at the right time and in the right way to increase productivity. It is very much a development reporting activity in the context of agricultural development to inform, educate and motivate farmers to accept new ideas and agricultural practices in order to increase production. Agricultural journalism is a specific, focused and systematic mode of writing for the people engaged in farming as a business for their subsistence. Agricultural journalist collects the desired information and keeping in view the specific needs of the farmers disseminates it through various methods of communication such as print, radio, television and social media

Fundamentals of agricultural journalism

There are some fundamentals of agricultural journalism which have to be kept in mind so that the information flows smoothly and farmers are able to accept, evaluate, adopt and adapt. Following are the tips for agricultural journalists to make the information intelligible to the farmer.

Use of simple and plain language

The agricultural journalist should translate the technical terms in a simple language and follow inverted pyramid while writing for farm journalism.

Presentation of innovative ideas

People understand new ideas which are presented in a logical manner and it will help them get the best return for their investment.

To the point and brief message

Farmers are able to remember the information given to them point wise and in brief, directing towards advantages to be achieved. The message should not be verbose.

Use of visuals

Visuals make the message more interesting, catchy and more meaningful. Increasing use of visuals in a message makes it more intelligible and pleasing to the eyes.

Message is Recent, Reliable, Realistic and Relevant

Message which is framed by taking above consideration is highly acceptable to the farmers.

Steps for Effective Writing

Effective writing for farmers, Agricultural journalist should follow four important steps which are based on research findings for effective writing in the print media.

1. *Planning:* Think how to best achieve the objective of the message.

2. *Writing:* After proper planning, an agricultural journalist takes up the writing of the message for the media.

3. *Trimming:* It has been observed that many agricultural journalists tend to be verbose. Pruning of writing is equally important.

4. *Checking and re-checking:* We must be economical in the use of words not in giving information. The fewer words a sentence have the more its intelligibility

Rules to be followed by a journalist

1. Study the field and have an estimate of what type of articles is published in newspapers, magazines, books etc.
2. Look ideas
3. Develop the idea
4. Keep an unbiased mind
5. Write clearly and meaningfully
6. Remember the people to whom the articles are written
7. Write with a purpose
8. Write on timely subjects
9. Keep in touch with editors
10. Watch out for important events/occasions
11. Establish credibility, politeness and do not assume familiarity
12. Understand the communication process and the elements of communication.

Sources of News

1. Result demonstrations
2. Research Stations
3. Research publications – Annual reports, highlights
4. Kisan melas
5. Farmers fields
6. Agricultural Universities / State Departments
7. Other extension activities like field days/training programmes etc.
8. Plan estimates related to agriculture and allied activities
9. Agriculture finance institutions
10. Agriculture input agencies
11. Agriculture Market committees
12. Electricity and irrigation sectors
13. Farmers committees and associations

14. NGOs etc.

Functions of Journalism

1. News function
2. The opinion function
3. The Entertainment function

ABC of Journalism

1. Accuracy
2. Brevity
3. Clarity

Diffusion of Innovation

Diffusion is the process in which an **innovation** is communicated through certain **channels** over **time** among the members of a **social system**.

Element of Diffusion

1. Innovation

An innovation is an idea, practice or object that is perceived as new by an individual or other unit of adoption. The perceived newness of the idea for the individual determines his or her reaction to it. The "newness" aspect of an innovation may be expressed in terms of knowledge, persuasion or a decision to adopt.

2. Communication channels

A communication channel is the means by which messages get from one individual to another. The following classification of channels would help the communicator to use them appropriately:

    i.   Interpersonal channels
    ii. Mass media channels
    iii. Cosmopolite channel
    iv. Localite channel

3. Time

Time is the most important element in the diffusion process. Time is an important aspect of any communication process. Time does not exist independently of events, but it is an aspect of every activity. The time dimension is involved in diffusion (i) in the innovation - decision process, (ii) in the innovativeness of an individual or other unit of adoption, and (iii) innovation's rate of adoption in a system.

4. Social system

It is a set of interrelated units that are engaged in joint problem solving to accomplish a common goal. The members or units of a social system may be individuals, informal groups, organisations and / or subsystems. The social system constitutes a boundary within which an innovation diffuses.

The Innovation Decision Process

The innovation decision process is the process through which an individual or other decision making unit passes from gaining initial **knowledge** of an innovation, to farming an **attitude towards the innovation**, to making a **decision** to adopt or reject, to **implementation** of the new idea and to **confirmation** of this decision.

This process consists of a series of choices and action over time through an individual or a system evaluates a new idea and decides whether or not to incorporate the innovation into ongoing practices.

Innovation Decision Process consist of five stage-**KPDIC**

1. Knowledge stage

- Knowledge occur when an individual or other decision making unit is exposed to an innovation's existence and gain an understanding of how it function

- Selective exposure
- Selective perception

Type of Knowledge

- *Awareness knowledge*- information that an innovation exists

- *How to Knowledge*- consist of information necessary to use an innovation properly. The adopter must understand what quantity of an innovation to secure, how to use it correctly. To date few diffusion investigation deals with how to knowledge

- *Principles Knowledge*- consists of information dealing with the functioning principles underlying how an innovation works. It is usually possible to adopt an innovation without principles knowledge, but danger of misusing a new idea is greater and discontinuance result
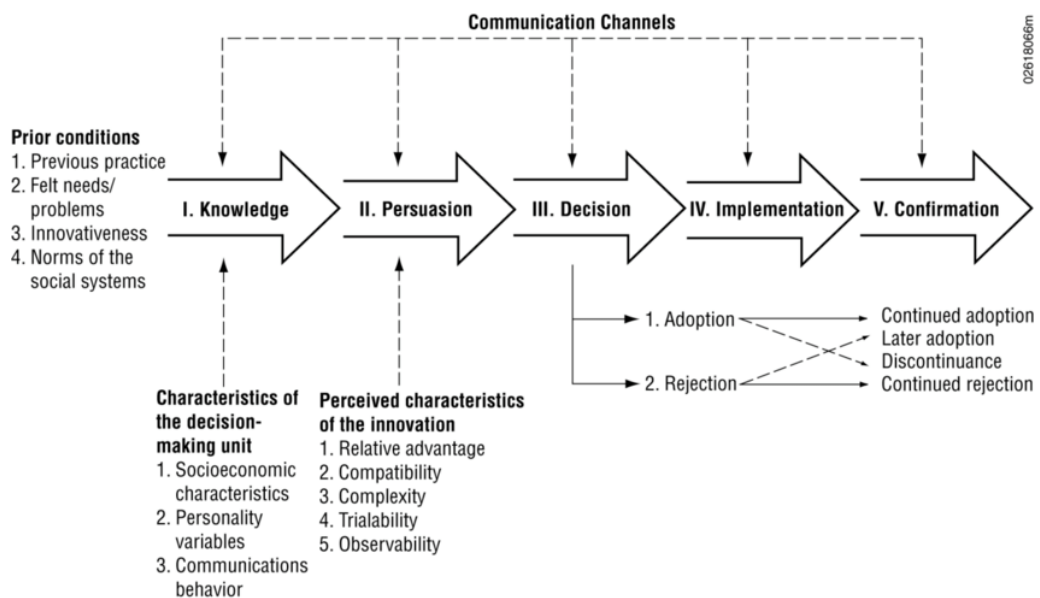
Paradigm in Innovation Decision Process

2. *Persuasion stage*

- Persuasion occur when an individual or other decision a making unit form a favourable or unfavourable attitude towards the innovation
- Attitude is a relatively enduring organization of an individual belief about an object that predispose his or her action
- Mental activity at knowledge stage was mainly **cognitive** (knowing)
- The main type of thinking at persuasion stage is **affective** (feeling)
- At persuasion stage individual become more **psychologically involved** with the innovation
- He or she actively seek information about the new idea, decide what messages he or she regard as credible, and decide how he or she interprete the information received
- Perceive attributes of innovation especially important at persuasion stage
  o Relative advantage, Compatibility and Complexity
- **Vicarious Trial-** an individual may mentally apply a new idea to his or her present or anticipated future situation before deciding whether or not to try it. This vicarious trial involves the ability to think hypothetically and

counterfactually and to project in to future. "Trial by others" provide a vicarious trial for an individual.

- **Cue-to-action**- an event occurring at a time that crystallizes a favourable attitude into overt behavioural change. Some cue-to-action occurs naturally or may be created by a change agency.

3. *Decision stage*

- Decision takes place when an individual or other decision making unit engaged in activities that lead to a choice to adopt or reject the innovation.
- **Adoption**- is a decision to make full use of an innovation as the best course of action available
- **Rejection**- is a decision to not adopt an innovation
- **Discontinuance**- A decision to reject an innovation after having previously adopted it. Two types-
  - **Active rejection**- which consist of considering adoption of the innovation including even its trial but then deciding not to adopt it.
  - **Passive rejection-** which consist of never really considering the use of the innovation. Also called **non-adoption.**

4. *Implementation stage*

- Implementation occur when an individual or other decision making unit **put** a new idea in to use.
- Until implementation stage, the innovation decision processes has been a strictly mental exercise of **thinking and deciding.**
- Implementation involves **overt behaviour change &**fallow decision stage rather directly until logistic problems arise.
- Active information seeking usually takes place at the implementation stage
- **Re-invention-** is the degree to which an innovation is changed or modified by users in the process of its adoption and implementation. Re-invention takes place at implementation stage of innovation decision process.

5. *Confirmation stage*

- Confirmation takes place when an individual or other decision making unit seek reinforcement of an innovation decision already made , but he or she may reverse this previous decision if exposed to conflicting messages about the innovation
- **Dissonance-** an uncomfortable state mind that an individual seeks to reduce or eliminate.
- **Discontinuance-**a decision to reject an innovation after having previously adopted it. Two types-
- **Replacement discontinuance-**a decision to reject an idea in order to adopt a better idea.
- **Disenchantment discontinuance-** a decision to reject an idea as a result of dissatisfaction with its performance.

Innovators and Adopters Categories

Innovativeness

The degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other member of social system. Innovativeness indicates overt behavioural change.

The S shaped Curve of adoption and Normality

- The time element of diffusion process allows us to classify adopter categories and draw diffusion curve.

- The adoptions of an innovation usually fallow a **normal, bell-shaped curve** when plotted over time on a **frequency basis**.

- If **cumulative number** of adopter is plotted, the result is an **S-shaped curve**.

- The part of diffusion curve from about **10 % adoption to 20 % adoption** is **heart of diffusion process**.

- The S shape curve is **innovation specific and system specific**, describing diffusion of a particular new idea among the member unit of a specific system.

Categorization of Adopters

Standardize adopter categories must decide on:

- The number of adopter categories

- The proportion of the member of a system to include in each categories

- The statistical method

Ideally categories should be –

- Exhaustive, including all unit of study

- Mutually exclusive, by excluding a unit of study that appear in one category from also appearing in other category

- Derived from a single classificatory principles

1. *Innovators*

Venturesomeness is due to desire for rash, the daring and risky, and willing to accept an occasional setback, gate keeping role, not respected by others member of social system. The area lying to left of the mean time of adoption of an innovation minus two standard deviation includes innovators (**2.5 %**).
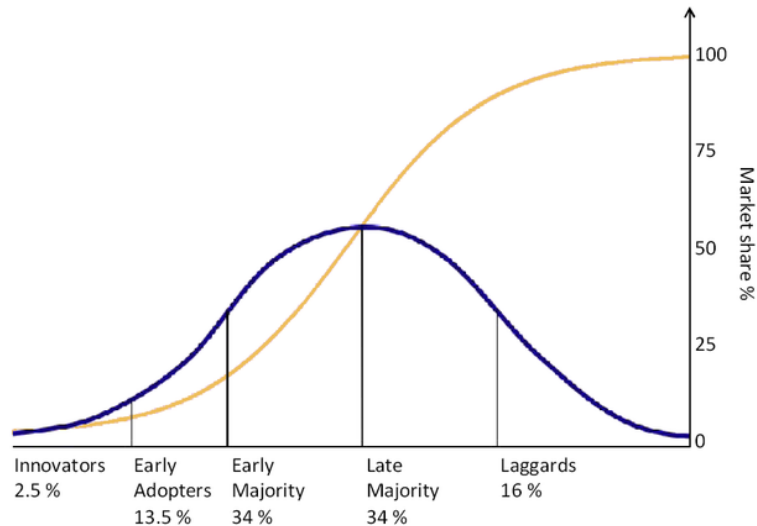
2. Early Adopters

Respectful, highest degree of opinion leadership, individual to check with ,local missionary, role model for other member of the social system, help to trigger the critical mass, make judicious innovation decision, subjective evaluation of innovation (**13.5 %).**

3. Early Majority

Deliberate, adopt new idea just before average member of a system, unique location, provide interconnectedness in a system, be not the first by which new is tried, nor the last to lay the old aside relate to them (**34 %**).

4. Late majority

Skeptical, adopt just after average member of a social system (**34 %**).

5. Laggards:

Traditional, most localities, the point of reference of laggard is past, suspicious, limited resources (**16 %**).

Characteristics of Adopter Categories

a. Socioeconomic characteristics

- Earlier adopters are no different from later adopter in age.

- Earlier adopter has higher social status, large size units, more likely to literate, more years of formal education, greater degree of upward social mobility than do later adopters.

b. Personality variables

- Earlier adopter have greater degree of empathy (the ability of an individual to project himself or herself into the role of another person) than do later adopter.

120

- Earlier adopter s may be less dogmatic (Dogmatism- is the degree to which an individual has a relatively closed belief system, that is, a set of belief which are strongly held) than do later adopters.

- Earlier adopters have greater rationality (use of most effective means to reach a given ends) that do later adopters.

- Earlier adopters have more intelligence, favourable attitude towards science, favourable attitudes towards change, greater ability to deal with abstraction, better able to cope with uncertainty, higher aspiration than do later adopters.

- Earlier adopters are less fatalistic (Fatalism is the degree to which an individual perceive a lack of ability to control his or her future) than are later adopters.

c. *Communication behavior*

Earlier adopters have more social participation, highly interconnected through interpersonal network in their social system, more cosmopolites, more contact with change agent, greater exposure to mass media communication channel, greater exposure to interpersonal communication channel, seek information about innovation more actively, greater knowledge of innovation, higher degree of opinion leadership than do later adopters.

Major ICT initiatives in India

S No.	Name	ProjectInitiator(type)	Area	TargetGroup	ImplementingAgency	SponsoringAgent	Year
1.	**aAQUA**	IIT, Bombay	Pune district, Maharashtra	Farmers	IIT, Bomaby	Media Lab Asia and Development Gateway Foundation	2003
2.	**e-Arik**		India	TribalFarmers	College of Horticulture and Forestry, Central Agricultural University (CAU)	Department of Scientific and Industrial Research (DSIR), Ministry of Science and Technology, Govt. of India	2007
3.	**AGRISNET (Agricultural Informatics and Communication Network)**	Department of Agriculture and Cooperation, Ministry of Agriculture, GoI	Rural areas of India	State/District Agriculture Departments, Allied Departments, Agri-Clinics, Agri-Business Centres and the Farming Community.	NICNET	Indian Council of Agricultural Research (ICAR)	2002
4.	**Agriwatch Portal**	Indian Agribusines Systems Pvt. Ltd. (IASL)	India	Farmers, traders, processors of agricultural outputs, suppliers of agricultural inputs, etc.	IASL	IASL	2001
5.	**AKASHGANGA**		Western part of India (Mainly Gujarat & Maharashtra)	Dairy farmers of Anand and other Gujarat & Maharashtra Districts	Shree Kamdhenu Electronics Pvt. Ltd. (AKASHGANGA)		1996

6.	**ASHA**	National Informatics Centre (Public Sector)	Assam	Farmers, functionaries, scientists, bankers and other stakeholders o fthe farm sector	NIC-Assam	Dept. of IT, Govt. of India	2001
7.	**Ashwini**	Byrraju Foundation	152 villages in over 5 districts of Andhra Pradesh – East Godavari, West Godavari, Guntur, Krishna and Ranga Reddy	Rural Population	Byrraju Foundation	NISG-UNDP	2005
8.	**Chalao Ho Gaon Mein**	National Foundation for India (NFI)	Palamau, Jharkhand	Local populace	Alternatives for India Development (AID),g rassroots NGO and Manthan Yuva Sangathan (run by journalists)	National Foundation for India (NFI)	2001
9.	**Coil-Net Content Development and IT localization Network): A Cultural Heritage Digital Library**	Dept. of IT, Ministry of Communications and Information Yechnology (MoCIT), Govt.of India (GoI)	Rajasthan, Haryana, Delhi, Uttaranchal, Uttar Pradesh, Madhya Pradesh,Chatti sgarh, Jharkhand and Bihar	Local populace of Hindi speaking areas.	Indira Gandhi National Centre for the Arts (IGNCA)	Ministry of Communication and Information Technology, Government of India.	2005
10.	**Community Information**	Department of Information Technology,	Arunachal Pradesh,	Rural Population	National Informatics Centre (NIC) and	Ministry of Development of North	2002

	Centres (CICs)	Ministry of Communications and Information Technology, GoI	Manipur, Assam, Meghalaya, Mizoram, Sikkim, Tripura, Manipur and Nagaland		National Informatics Centre Services Incorporation (NICSI)	Eastern Region	
11.	**Community Radio - Deccan Development Society**	Deccan Development Society	Medak District, Andhra Pradesh	Dalit women	DDS	UNESCO	1998
12.	**Computers on Wheels**	Global Catalyst Foundation	Telengana region of Andhra Pradesh	Rural population of Mahboob Nagar, AP	Global Catalyst Foundation & partners	Digital Partners	2003
13.	**Creating Rural Entrepreneurs through ICT enabled Enterprise Development Services**	Development Alternatives (Tarahaat Informational & Marketing Services Ltd.)	Jhansi (Tikamghar) / Lalitpur - 7 states of India	Youth, women,self-help groups, landless and small land holders	Development Alternatives	UNDP-NISG	2005
14.	**Deccan Development Society – Community Gene bank Project**	Deccan Development Society (DDS)	Medak district of Andhra Pradesh	Women of DDS Sanghams	Women's group, Vahirabad	Integrated Rural Development Programme - EED, Germany and Food Security Programme in Andhra Pradesh – Christian Aid, U.K/ Germany	1996
15.	**Department**	National Informatics	Himachal	Citizen	NIC Jammu & Kashmir	Govt. of India	2003

	of Agriculture and Cooperation Network (DACNET)	Centre (NIC), Ministry of Agriculture, GoI	Pradesh			
16.	Digital Mandi	Media Lab Asia	India	Farmers	Media Lab Asia	Media Lab Asia, Kanpur – Lucknow (MLAKLH) hub	2003
17.	Digital Payment System	Vidya Pratishthan's Institute Of Information Technology, Baramati- India (Public Sector)	Pune district, Maharashtra	Rural Communities of Baramati and western Maharahstra	Vidya Pratishthan's Institute Of Information Technology (VIIT), Baramati, India	Govt. of Maharashtra	2002
18.	AGMARKNET	Ministry of Agriculture	India	Haryana and North Indian Farmers	National Informatics Centre (NIC)	Directorate of Marketing and Inspection (DMI) - Ministry of Agriculture(GOI)	2000
19.	e-Krishi / Agri-Business Centers	Akshaya e-Kendra Entrepreneurs	Malappuram District, Kerela	Farmers, Agricultural Input Providers, Agricultural Activists, NGOs and Government organizations	Kerala State IT Mission	UNDP-NISG	2005
20.	e-KRISHIVIPANAN	State Government	Madhya Pradesh	Agriculturists and farmers	Madhya Pradesh Agricultural Marketing Board (Mandi Board) and Madhya Pradesh Agency for Promotion of Information Technology (MAP_IT)	Govt. of Madhya Pradesh	2003
21.	e-Sagu	International Institute of Information Technology–Hyderabad	India	Farmers	International Instituteof Information Technology, Hyderabad	Ministry of Communication and Information Technology, Govt.	2004

						Of India	
22.	**Gender Resource Center (GRC)**	Ministry of Agriculture (GoI)	All India	Rural women	Women Cell of Directorate of Extension, Department of Agriculture & Cooperation, Ministry of Agriculture (GoI)	Govt. of India	2004
23.	**Grasso PCO Project**	Grameen Sanchar Society, BSNL	West Bengal	Farmers & Villagers	GRASSO	GRASSO, Dept. of IT - Govt. of West Bengal	2003
24.	**Gyandoot**	Government of Madhya Pradesh	311 Gram Panchayats and over 600 villages have been covered by 20 Soochanalayas of Dhardistrict	Tribal and rural population	Govt. of MP, NIC	Govt. of MP	2000
25.	**Gyan Sanchar**	CIDA,BSNL, Govt. of MP	Hoshangabad and Harda districts, Madhya Pradesh	Rural population	Gyan Sanchar and local entrepreneurs	Canadian International Development Agency (CIDA)	2002
26.	**HP iCommunity**	HP, Govt. of AP	Chittor District, Andhra Pradesh	Youth	Hewlett Packard Ltd	Hewlett Packard Ltd	2002
27.	**i-Shakti**	Unilever	Nalgonda, Vishakapatnam, West Godavari and East Godavari districts of Andhra Pradesh	Women &Youth	Unilever, e-Seva and other NGOs	Hindustan Level Ltd	2004

28.	**ICT Intervention for farmers through Query Redress Services**	Indian Agribusiness Systems Private Limited (Privatesector)	Villages in Maharashtra	Farmers, professionals and stakeholders involved in agricultural and allied sectors	Indian Society of Agribusiness Professionals (ISAP) along with partner NGOs in the state of Maharashtra: MAITREE, AVANI, MANAVLOK	Microsoft	2006
29.	**IndiaRuralWorld.com**	CoOptions Technologies Limited	Andhra Pradesh	Rural Population	CoOptions Technologies Limited	CoOptions Technologies Limited	1999
30.	**Information and Communications Technologies for Development (ICTD): Making ICT work for people.**	Department of IT GOI (Gachi Bowli)	All India	Rural and Urban areas.	National Institute for Smart Governance (NISG)	United Nations Development Programme (UNDP)	2003 -07
31.	**Information Village Centers of MSSRF**	MSSRF (M.S. Swaminathan Research Foundation)	12 villages in Pondicherry region	Rural families particularly marginal farmers, fishermen and assetless	M S Swaminathan Research Foundation	International Development Research Centre (IDRC),Canada	1998
32.	**Interlingua Web**	Media Lab Asia hub at IIT, Mumbai	All India	Citizens of India	Media Lab Asia	Media Lab Asia	2003
33.	**ITC eChoupal**	ITC Limited, Private Funding Agency (Profit SECTOR)	Madhya Pradesh, Haryana, Uttaranchal, Karnataka, Andhra	Farmers	ITC's International Business Division(IBD)	ITC's IBD	2000

		Pradesh, Uttar Pradesh, Maharashtra, Rajasthan and Kerela				
34.	**Jagriti e-Sewa**	Jagriti (NGO)	Punjab	Rural Population	Jagriti-eSewa	Jagriti e-Sewa	2003
35.	**Jamset Ji Tata National Virtual Academy for Rural Prosperity**	MSSRF	Pondichery	Vulnerable rural communities	M.S Swaminathan Research Foundation	Sir Dorabji Tata School Welfare Trust	2003
36.	**Kisan Call Centers**	Department of Agriculture & Cooperation (DAC), Ministry of Agriculture, Govt. of India	India	Farmers	Coconut Development Board	DAC	2004
37.	**Kisan Soochana Kendra (KSK)**	IIT-Roorkee	Uttaranchal	Youth	Jai Kisan	UNDP, Dept.ofIT–Govt. of Uttaranchal, NIC Uttaranchal	2005
38.	**KISSAN Kerala**	Indian Institute of IT and Management-Kerala(IIITM-K)	Kerala	Farmers	Indian Institute of IT and Management (IIITM-K)-Kerala	Dept. of Agriculture, Govt. of Kerala	2003
39.	**Krishi Bazar Mahiti**	VIIT-Baramati, Govt. of Maharashtra	Baramati District of Maharahstra	Farmers & Youth	VIIT and Franchise	Maharashtra Knowledge Corpn Ltd, ICAR, New Delhi	NA
40.	**Kudumbha Shree**	Government of Kerala	Kerala	Family as a whole and women in particular.	Govt.of Kerala	Government of Kerala	1999
41.	**Muruggappa**	EID Parry	Tamil Nadu	Farmers	EID Parry	EID Parry Ltd	2002

	Groups' EID Parry						
42.	**Online Integrated Computerized Systems (OICS) - Sumul Dairy**	Surat District Co-operative Milk Union Ltd (SUMUL)	12 district unions, Gujarat	Rural population, farmers	SUMUL	SUMUL	1999
43.	**OSCAR (Open Source Simple Computer for Agriculture in Rural Areas)**		India and neighbouring countries under gangetic plaine	INDIA	IFP (French Institute of Pondicherry)	(OSCAR) is a collaborative effort, initiated by IFP (French Institute of Pondicherry) with Rice-Wheat Consortium for Indo-Gangetic Plains, India, French Agricultural Research Centre for International Development (CIRAD), and Communication and Innovation Studies of Wageningen University, The Netherlands as partners in action.	2006
44.	**Pravara Village ITProject (PRAGATI)**	KVK (Krishi Vikas Kendra)	Ahmednagar district, Maharastra	Rural population specially women	Convergent Communications	Convergent Communications, Pravara Group	1999

45.	**RASI (Rural Access to Services through Internet) MAIYAMS**	FOOD	Kanchipuram, Thoothukudi and Kanyakumari districts of Tamil Nadu	Rural population	Foundation of Occupational Development (FOOD)	Govt. of Tamil Nadu	2003
46.	**Rural Knowledge Center (RKC)**	Microsoft Corporation India Private Limited, NASSCOM (National Association of Software and Services Companies) Foundation and the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)	Nine coastal states of India –West Bengal, Orissa, Andhra Pradesh, Tamilnadu, Kerala, Karnataka, Goa, Maharashtra and Gujarat.	Villagers and people of other remote areas	Microsoft-NASSCOM Foundation-ICRISAT	Microsoft (Nasdaq"MSFT")	2004
47.	**Sahaj Tathya Mitra: Common Service Centers**	Srei Infrastructure Finance Ltd. (a non-banking finance institution)	Darjeeling, Jalpaiguri , Cooch Bihar, Uttar Dinajpur and Dakhin Dinajpur, Malda, Murshidabad, Nadia and South 24 Parganas, Purba Midnapur, Bankura, Birbhum, Haowra	Rural populace	Srei Infrastructure Finance Ltd. and West Bengal Government	Srei Infrastructure Finance Ltd. And West Bengal Government	2007

		and Hoogly.				
48.	**Society for Andhra Pradesh Network (SAPNET)**	Department of IT & C, Government of Andhra Pradesh	Andhra Pradesh	Citizen	APTS, ISRO	Govt. of Andhra Pradesh	2002
49.	**Soochna Se Samadhan**		Himachal Pradesh, Madhya Pradesh and Uttar Pradesh	Villages of India	One world south Asia	UNDP	2006
50.	**Sustainable Dryland Agriculture**	Govt. of Andhra Pradesh	Mahaboob nagar, Medak, Nizamabad, Karimnagar and Adilabad districts of Andhra Pradesh	Information is disseminated through a computerized network to the women farmers who are mostly illiterate. This includes agronomic practices, farming methods, methods to access and use technologies etc.	Mahila Sangams (Andhra Pradesh) and South Asia Poverty Alleviation Programme (SAPAP)	Ministry of Agriculture, GoI and UNDP	1993
51.	**Sustainable Livelihood Improvement**	JIBAN BIKASH(NGO)	Nuapada District, Orissa	BPL rural families - youth, adults, women, men	Jiban Bikash	Govt. of India	NA
52.	**Swajaldhara**	Department of Drinking Water Supply	11 districts of Uttaranchal	Rural population	Uttaranchal Peyjal Nigam, Uttaranchal Jal Sansthan and PMU	Govt. of India	2002

				Swajal		
53.	**Swayam Krishi Sangam (SKS) Microfinance**	Swayam Krishi Sangam	Andhra Pradesh, Karnataka, Maharashtra, Orissa and Madhya Pradesh	Rural poor, landless laborers or marginal farmers, women and Dalits	Swayam Krishi Sangam	Women's World Banking, CGAP, Grameen Foundation USA, American India Foundation	1998
54.	**Tamil Nadu Women in Agriculture (TANWA)**	Ministry of Agriculture, (GoI)	Tamil Nadu	Rural women	Directorate of Agriculture	DANIDA and Govt. of India	1994 - 2003
55.	**Tara Haat - TARA Nirman Kendras**	Development Alternatives	Jhansi, Gwalior, Datia, Tikamgarh and Bhind districtsof Uttar Pradeshand MadhyaPradesh	Youth	Tara Haat	Development Alternatives	2001
56.	**Tata KisanKendra**	TataSons	Uttar Pradesh, Haryana and Punjab	Farmers	Tata Chemicals Limited(TCL)	Tata Chemicals Limited(TCL)	2003
57.	**VASAT Project**	ICRISAT	Villages of Mahboobnagar district, Andhra Pradesh	Farmers, Youth & Children	ICRISAT and NGOs	ICRISAT	2003
58.	**Village Information Kiosks, Andhra Pradesh**	National Institute of Agricultural Extension Management	Ranga Reddy district of Andhra Pradesh	Farmers' community and rural women	MACTCS (Mutually Aided Cooperative Thrift and Credit Societies), Ranga Reddy district	Ministry of Agriculture, GoI	2000 - 2003

				(MANAGE), Ministry of Agriculture		
59.	**Village Resource Centres (VRCs)**	Indian Space Research Organisation (ISRO), MS Swaminathan Research Foundation (MSSRF)	Tamil Nadu	Villagers	Satyabama Universit; Chennai, Indian Space Research Organisation (ISRO)	ISRO-MSSRF	2004
60.	**Warna Wired Villages Project**	Warna Co-operative Society	Kolhapur and Sangli district, Warna Nagar, (70 villages in and around Warna) Maharashtra	Farmers and rural population of Warna Nagar	National Informatics Centre (NIC),Directorate of Information Technology, Government of Maharashtra (GoM) and Warana Sahakari Dudh Utpadan Prakriya Limited (WSDUPL)	National Informatics Centre (NIC) and Directorate of Information Technology, Government of Maharashtra (GoM)	1998
61.	**West Bengal Citizen Portal**	Govt. of West Bengal	West Bengal	Citizen	West Bengal Electronics Industry Development Corporation Ltd.: A Govt. of WB undertaking	State Govt.	
62.	**Wireless Internet Post Office**	Department of Computer Science and Technology	India	Needy people and the villagers	Department of Computer Science and Technology	Asia Pacific Development Programme (APDIP)	2003

References

Ahmed, M. R. (1991. Planning and Designing Social Forestry Project. In Ahmed, M. R. (ed.) Social Forestry and Community Development, pp. 109 - 116. FAO, FTPP.

Claudio Zaki Dib (1988). Formal, Non-Formal and Informal Education: Concepts/Applicability. Cooperative Networks in Physics Education - Conference Proceedings 173", American Institute of Physics, New York, pp. 300-315 retrieved from http://techne- dib.com.br/downloads/6.pdf

Dhama, O.P. and Bhatnagar, O.P. (1991). Education and Communication for Development. New Delhi, Oxford IBH Publishing Co.

De, D. and Jirli, B. (2010). A Handbook of Extension Education. Jodhpur, Agrobios (India).

Dimensions Of Agricultural Extension: (Aext191) (1+1). Principles, Philosophy Processes and Objectives Of Extension Retrieved fromhttp://eagri.org/eagri50/AEXT191/lec02.pdf

Dushi Guari. Notes on the Types of education: formal, informal, non-formal. Retrieved from http://www.preservearticles.com/notes/notes-on-the-types-of-education-formal-informal-non- formal/17995

Extension Program Planning and Evaluation. (2020 Jan. 10). retrieved from http://eagri.org/eagri50/AEXT392/lec02.html

Education from Wikipedia retrieved from https://en.wikipedia.org/wiki/Education

Fundamental of Rural Sociology & Educational Psychology, (AEXT391) (2+0), lect1 retrieved fromhttp://eagri.org/eagri50/AEXT391/lec01.pdf

Gibson, D.V., Rogers, E. & Wohlert, K. (1990). A Communication-based Model of TechnologyTransfer. Paper presented at the International Communication Association Meeting, Dublin,Ireland.

Gowda, K. N.(2016) Agricultural Extension Systems in India. retrieved fromhttp://fliphtml5.com/bxhp/sxdi/basic

Govind, S., Tamilselvi, G. and Meenambigai, J. (2011). Extension Education and Rural Development, Jodhpur, Agrobios (India).

Gibson, D.V. & Smilor, W. (1991). Key Variables in Technology Transfer: A field – StudyBased on Empirical Analysis. Journal of Engineering and Technology Management, 8, p. 287-312.

http://eagri.org/eagri50/AEXT392/lec11.html

https://newsmoor.com/3-types-of-communication-models-linear-interactive-transactional/

Joy, D. and Sreekumar, K. (2014). A Survey of Expert System in Agriculture. International Journal of Computer Science and Information Technologies, 5 (6): 7861-7864.

Jaiswal, A. and Rai, S.K. (2019).Fundamentals of Agricultural Extension Education. Department of Extension Education College of Agriculture, Balaghat Jawaharlal Nehru Krishi VishwaVidyalaya Jabalpur 482 004 (M.P.),India pp. 1-62.

Lab to Land Programme. (2012, Jan 11).Retrieved from
http://ecoursesonline.iasri.res.in/mod/page/view.php?id=15377

Legans, J. P. (1961). Characteristics of Teaching and Learning in Extension
Education, Extension Teaching Methods, The Communication Process and
Programme Planning toMeet People's Needs in Extension Education in Community
Development . Directorate of Extension, Govt. of India, New Delhi.

Mishra, S. and Akankasha (2014). Expert Systems in Agriculture: An overview.
International Journal of Science Technology & Engineering, 1(5): 45-49.

Mondal, S. (2018). Communication Skills and Personality Development,
Entrepreneurship Development and Business Communication. New Delhi,
Kalyani publishers.

Mondal, S. (2019). Fundamentals of Agricultural Extension Education. Kalyani
publishers, New Delhi.

O.P. Dhama and O.P. Bhatnagar (2006). Education and Communication for
Development,New Delhi: Oxford and IBH Publishing Co.

Principles of Extension Education, Dairy Extension Education.
Retrieved from
http://ecoursesonline.iasri.res.in/mod/resource/view.php?id=4360

Ray, G.L. (1996). Extension Communication and Management, Calcutta, West Bengal:
Naya Prakash Publications.

Ramanathan, K. (1994). The polytrophic components of manufacturing technology.
Technological Forecasting & Social Change, 46, 221-258.

Rogers, E.M. (1983). Diffusion of Innovations: Third Edition. The Free Press: A Division of
Macmillan Publishing Co., Inc.

Ray, G. L. (2013). Extension Communication and management. New Delhi. Kalayni
publication.

Sharma, A. (2016). Education: Meaning, Definition, types of education and
characteristics, Extension education: Meaning, definition and concept.
Retrievedfrom https://www.slideshare.net/Arpita615/education-meaning-definition-
types-of-education-and- characteristicsextension-education-meaning-definition-and-
concept

Sharma,O.P.(2012). Development perspective of extension education. Udaipur, Agrotech
Publishing Academy.

Singh, R. (1987). A textbook of extension education. Ludhiana, Sahitya Kala Prakashan.

Soil Health Card (2014, March 20)
retrievedfrom.https://soilhealth.dac.gov.in/Content/blue/soil/about.html

Sandhu A. S. (2003). Extension Programme Planning. New Delhi, Oxford and IBH
Publishers.

Souder, W.E., Nashar, A.S. and Padmanathan, V. (1990). A guide to the best technology transfer
practices. Journal of Technology Transfer, 15(1-2).

Sulaiman, V.R. and Sadamate, V.V. (2000). Privatising agricultural extension in India, Policy Paper 10. New Delhi: National Centre for Agricultural Economics and Policy Research.

Sasidhar, P.V. (2019 .(2.ceD(Programme Planning .retrieved from http//:www.egyankosh.ac.in/bitstream/123456789/39227/1/Unit-1.pdf

Programme planning. (2020 Jan. 15) retrieved from http://ecoursesonline.iasri.res.in/mod/resource/view.php?id=4384

Ray, G. L. (2017). Extension Communication and Management. New Delhi, Kalyani Publisher. Pp 227-248

https://www.yourarticlelibrary.com/sociology/rural-leadership-meaning-and-characteristics-of-rural-leadership/34944

The Computer Revolution/Artificial Intelligence/Expert Systems. Retrieved fromhttps://en.m.wikibooks.org/wiki/The_Computer_Revolution/Artificial_Intelligence/Expert_System s

Van den Ban, A.W. and Hawkins, H.S. (2002). Agricultural Extension, New Delhi, CBSPublishers and Distributors.