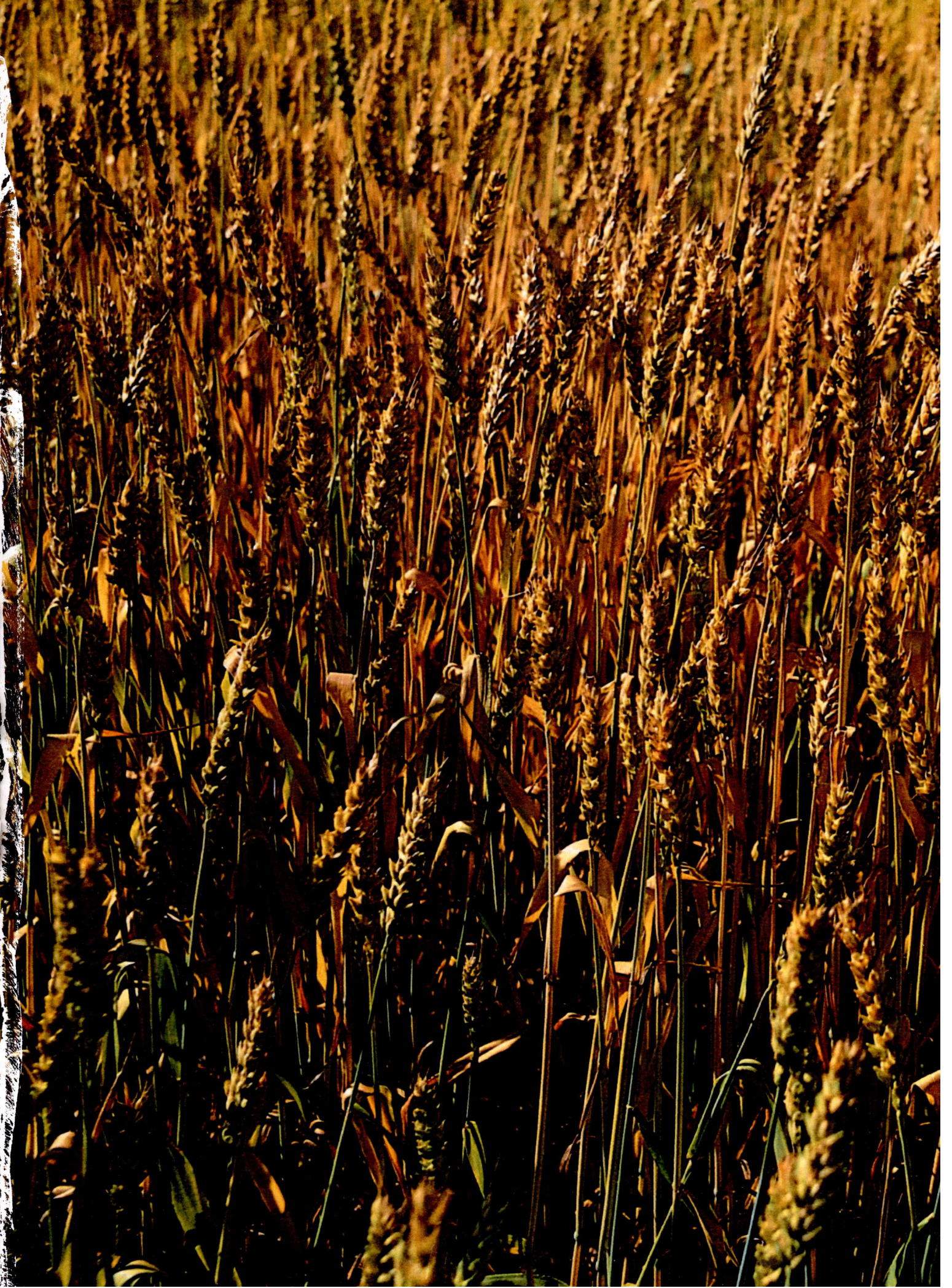
Agricultural Extension Methodology for Transfer of Technology

Training Manual

ICARDA

International Center for
Agricultural Research in the Dry Areas

Regional Program for Central Asia and the Caucasus
Tashkent, Uzbekistan



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Prepared by

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Citation: P.N. Mathur, R.S. Paroda, M. Mussayeva. 2007. ICARDA in Central Asia and the Caucasus: Agricultural Extension Methodology for Transfer of Technology. Training Manual based on the Materials of the Regional Training Course, 21-25 November, 2005. ICARDA CAC, Tashkent, Uzbekistan.

Printed - March, 2007

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Foreword

Establishment of suitable Agricultural Extension Services is currently one of the major challenges being faced by the countries of Central Asia and the Caucasus (CAC). Structural reforms in the agricultural sector since independence in 1991 have led to drastic changes in the whole process of technology transfer. As a result, the link between agricultural research and technology transfer to farmers has been weakened.

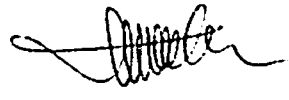
In the former Soviet system, technology transfer was totally centralized and implemented through the unified command system. Extension and advisory services did exist as the integrated system of collective farms in the past. With the gradual disintegration and land privatization, the transfer of technology (ToT) system has been lost. Moreover, in the process of a paradigm shift from farm workers to farmers demand better access to new farm management practices around crop diversification. Hence, ToT has become a real need in the present context. Virtually, the rural communities of the region are currently without any functional extension advisory service.
In some countries, now the need for extension and rural advisory services is being felt and efforts are being made to strengthen these suitably. However, extension services involves mostly those persons who earlier worked as specialists of certain discipline on the collective state farms and as such, have limited knowledge or experience in comprehensive farm management and diversified agriculture. Moreover, national policies towards establishment of extension and rural advisory services are still not so well defined and formulated. With the result, the role of ToT is also performed mainly by the scientists and research managers. The need to upgrade knowledge and skills of existing national cadre in the complex process of technology transfer and knowledge sharing, therefore, becomes obvious.

In view of the importance of the subject, a regional training course on "Agricultural Extension Methodology and Transfer of Technology" was organized by ICARDA from 21-25 November, 2005 in Tashkent, Uzbekistan, under an ADB Project "Improving Rural Livelihoods through Efficient Water and Soil Fertility Management in Central Asia".

The major objective of the training course was to jointly discuss and critically examine the current status and perspectives of agricultural extension services development in the region by bringing together three important stakeholders, i.e. policy makers, researchers, and farmers together. In all, 25 participants from six countries in the region took part in this training program. This effort proved to be highly beneficial. Dr. P.N. Mathur, a senior extension specialist from India, organized very useful course material and all participants felt that this information be shared with the national systems for larger benefit of scientific, extension and farming communities. As such, it was decided to compile, edit and publish the entire training material for the benefit of all concerned.

This publication has been brought out both in English and Russian to facilitate easy absorption of the information by policy-makers, research professionals as well as farmers. The information included was widely discussed with the participants of the training program and their corresponding feedbacks were taken into consideration for further revision in its present form.

I sincerely hope that the information provided in this publication will serve useful purpose for the transfer of new technologies for increased productivity, higher income and sustainability of agriculture in the CAC region. I congratulate its authors Dr. P.N. Mathur, Dr. Raj Paroda and Ms. Madina Musayeva for this very timely effort.



Dr. Mahmoud Solh
Director General, ICARDA
Chairman, CDC Task Force for CAC

Acronyms

APAARI	Asian Pacific Association of Agricultural Research Institution
ATIC	Agricultural Technology Information Center
AV	Audio-Visual
ELC	Experiential Learning Cycle
EV	Extension Volunteers
FAO	Food and Agriculture Organization of the United Nations
FIG	Farmers' Interest Group
GFAR	Global Forum on Agricultural Research
IARI	Indian Agricultural Research Institute
ICAR	Indian Council of Agricultural Research
ICARDA	International Center for Agricultural Research in Dry Areas
IVLP	Institute-Village Linkage Program
KVK	Krishi Vigyan Kendras (Farm Science Centers)
LLP	Lab-to-Land Program
MEV	Master Extension Volunteers
NAIP	National Agricultural Innovation Project
NARS	National Agricultural Research System
NATP	National Agricultural Technology Project
NDP	National Demonstration Project
NGO	Non-Government Organization
ORP	Operational Research Project
PAR	Participatory Action Research
PLA	Participatory Learning and Action
PRA	Participatory Rural Appraisal
SHG	Self Help Group
SMS	Small Production System
TAAS	Trust for Advancement of Agricultural Sciences
TAR	Technology and Refinement
WIG	Women Interest Groups

1. Brief History of Agricultural Extension

Agricultural Extension is a social innovation that has brought about significant agricultural changes in the last few decades in the developed and the developing world. Although evolved over a long period, in the last two centuries it has impacted a large number of farming communities through diverse activities. The use of the word "Extension" derives from an educational development in England during the second half of the nineteenth century. The two ancient universities of Oxford and Cambridge initiated "university extension" to serve the educational needs of the growing urban population.

The growth and success of this work in Britain influenced the initiation of similar activities elsewhere, especially in the United States and, later on, in the developing countries. Initially, extension work focused on the of agriculture, addressing the needs of that time. Thus evolved the term "Agricultural Extension." The landmark in the history of Agricultural Extension in the US was the passage of the Smith Lever Act in 1914, establishing the Cooperative Extension Service. It was a tripartite cooperation of federal, state and local county governments with the state college as the extension agency. The main objective of this service was to aid in diffusion of useful and practical information on subjects relating to agriculture and home economics, and to encourage the application of the same by the farmers.

Another land mark was the establishment of the Land Grant University (Land Grant College) system in the US and later on in some parts of Asia, notably, India. Extension became one of the important functions along with education and research (see Figure 1). These Universities extended relevant and useful information to the farming families, especially the adult population at large, through informal educational methods. Several developing countries adopted the Land Grant System, and also the concept of Extension, to develop their agriculture. In the US, state universities were assigned all the responsibility for education, research and extension work in the state in an integrated manner. There was a symbiotic relationship among all the three functions, each supporting the other. The funds were drawn from the income the university earned out of the land granted by the government.

However, in the Indian model, the extension responsibility remained with the state governments while in the university (in fact the whole research system including the ICAR institutes) participated in the extension efforts through frontline extension system. This type of extension aimed at helping research system in development and demonstration of new technologies before passing them on to farmers.

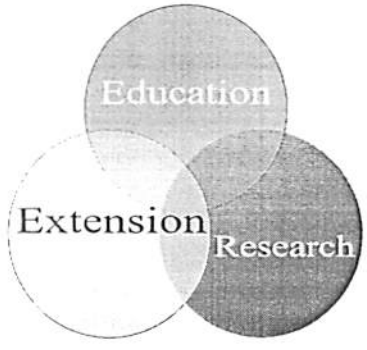


Figure 1. Integration of Education, Research and Extension

Thus, Agricultural Extension was developed in different parts of the world and at different times. The following conditions favored the development of Extension:

- Availability of new information to the farmers. The information is either generated through research findings or experience.
- Use of this information to educate professional agriculturists (including farmers) who may further enlarge or refine this body of knowledge or become active disseminators of the same.
- Existence of an appropriate administrative structure to promote dissemination of the new information.
- Official mandate to carry out the extension work.

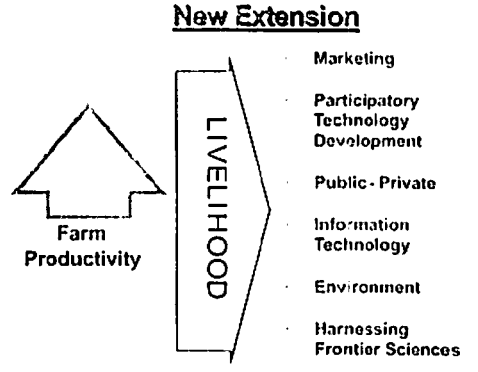
The Farmer-centered Extension

In the past fifty years, Agricultural Extension has been adopted as the major mechanism of technology dissemination to the farmers. Across the continents, it has become the main vehicle of agricultural change through government's initiative and, later, through peoples' participation. To begin with, the main focus of extension was to increase production and productivity of food and fiber. The latest challenge facing the world's agriculture is to provide livelihood to the millions of farmers and to sustain production at reasonable levels in an environmentally safe manner.

The Figure 2 clearly shows the new priorities in extension. Increasing farm productivity still remains the basic priority in extension work. However, the focus has shifted to livelihood of the farm families. Providing livelihood to the poor seems to be a greater need of the day than simply increasing farm production. It is important, "to look beyond agricultural extension to a more inclusive livelihoods extension".

The added six aspects have direct bearing on extension: 1) marketing of agricultural produce; 2) participatory technology development jointly by researchers, extension workers and farmers; 3) joint responsibility of public and private sector in extension; 4) use of information technology in extension; 5) sustaining natural resources and environment; 6) encouraging use of frontier science in agricultural technology development.

Figure 2.
Farmers' livelihood - centered extension



You would notice that the extension of today is more leaning towards the man rather than technology. The technologies are only the means of development of the standard of living of the farmers. There is an obvious paradigm shift from the traditional welfare approach to economic and self-development of the farmer's family through systems approach and diversified agriculture.

Empowerment of the farmer is the focus of the new paradigm of extension. Keeping these developments in view, it can be said that extension as a discipline and a system has become truly multidisciplinary.

Agricultural Extension in CAC region

During the Soviet era, in the most Central Asian countries, agricultural extension was organized using the strict top-down approach, which constrained farmer-to-farmer transfer of technology. With the break-up of the Soviet Union, this problem was aggravated by a major economic decline. Now the situation is changing, as the whole approach to agricultural development is being modernized in all countries of the region. Today, there is more scope for the people to participate in their own development efforts and adopt innovative approaches. Progress was initiated through several development projects supported by international organizations, such as the CG Centers, the World Bank, Asian Development Bank, Aga Khan Foundation, and others.

Research and Extension are inseparable

It has been rightly said that research without extension is a hobby and extension without research is a folly. This stipulates the importance of the following three components for any farm development system:

1) Technology or the subject matter that comes out of research or experience.
2) Extension system including means of communication.
3) Farmers who use technology for higher production and productivity.

All three components (see Figure 3) are essential for agricultural development. They are inseparable and have to work in an orchestrated manner to secure the results. Therefore, it is obvious that research and extension have to work together towards a common goal i.e. reaching farmers with new technologies and bringing about favorable changes in them. It would be difficult to separate research and extension roles in an agricultural system as both have to help each other in performing their respective functions.

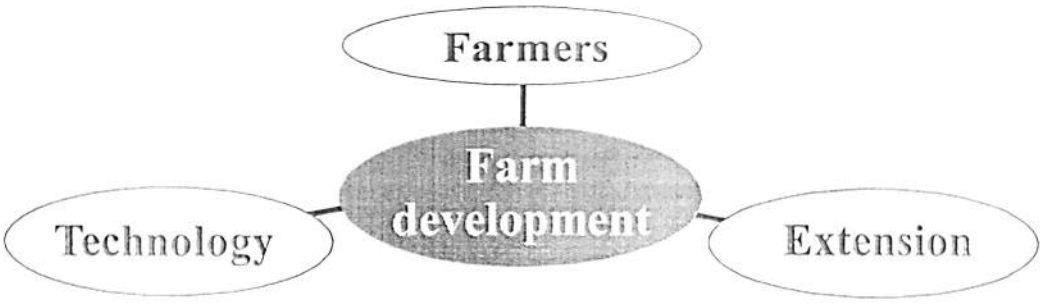


Figure 3. The three components of Farm development

Researchers, in order to develop new technologies, must know the needs of the farmers and their opinion about the new technologies, when those are put into practice (through feedback). Receiving feedback is extremely important to decide, what research has to do, and how. Sometimes, it is only refining of existing technologies that is required in order to improve the chances of adoption by the farmers. Extension helps in bringing field experiences into research. In fact, Extension system is the main facilitator in getting the information on need assessment and feedback from the farmers.

Moreover, Extension is responsible for bringing the technology from the research system (research stations) to the farmers. In the new arrangement, the researchers conduct research that is based on farmers' needs and help in transfer of technology through on-farm demonstrations, and the extensionists assist the researchers by providing feedback on the research findings. Thus, the dividing line between research and extension is weakened. The researchers would be able to perform their role of technology development in a better way if they learn the basics of extension, fundamentals of adult behavior and extension methods available for effective transfer of technology and farmers' need assessment.

The present training program is a step in this direction. In the distant past it was unthinkable for the researchers to get involved in conducting field demonstrations on the technologies developed by them. Now it is a reality and the need of the day!

What is Agricultural Extension?

Let us get acquainted with the term "Agricultural Extension". The basic term is "Extension", which denotes an educational process. For this reason, it is mostly called as **"Extension education"**. Such education can be provided in many subject matter areas, and is named accordingly, viz., Home Science Extension, Veterinary Extension, Industrial Extension, and so on. Our main focus is Agricultural Extension, which refers to educational services provided to particularly those who live in rural areas and is often vocational in emphasis. Yet, as extension is essentially a process of education, and so are its basic concepts, we would use the term **Extension education** in our training program.

Besides the "service" dimension of extension, there is another aspect that is very important. That is the educational aspect which deals with the behavioral dimension of the people with whom the extension work is done. Therefore, Extension education has been defined as an applied behavioral science, the knowledge of which is applied to bring about desirable changes in the behavior of human beings usually through various strategies and programs of change and by applying the latest scientific & technological innovations.

In simple terms, Extension is an educational process purposed to change attitudes and practices of the people with whom the work is done. It is also referred to as an informal out-of-school education and

services for the members of the farmers' families and others directly or indirectly engaged in farm production.

The basic components of Extension education in the context of agricultural development are:

- It is an educational process.
- It covers the entire class of farmers.
- It aims at changing attitudes and behavior of the farmers.
- It motivates farmers to adopt new practices to improve their livelihood.
- It carries new technologies to the users.

Extension education has now developed as a full-fledged discipline, having its own philosophy, objectives, principles, methods & techniques which must be understood by every extension worker & others connected with the rural development.

Is Extension education different than Formal Education?

Extension education, unlike formal school education, is an informal education system. In that sense, there are several differences between the two. Some of these differences are shown below.

Formal education	Extension education
1. The teacher starts with theory & works up to practical.	1. The teacher (extension worker) starts with practical & may take up theory later on.
2. Students study subjects.	2. Farmers study problems.
3. Students must adapt themselves to the fixed curriculum offered.	3. It has no fixed curriculum or course of study and farmers help to formulate the curriculum.
4. Authority rests with the teacher.	4. Authority rests with the farmers.
5. Class attendance is compulsory.	5. Participation is voluntary.
6. Teacher instructs the students.	6. Teacher teaches & also learns from the farmers.
7. Teaching is only through instructors.	7. Teaching is also through local leaders.
8. Teaching is mainly vertical.	8. Teaching is mainly horizontal.
9. The teacher has more or less homogeneous audience.	9. The teacher has a large & heterogeneous audience.
10. It is rigid.	10. It is flexible.
11. It has all pre-planned and pre-decided programs.	11. It has freedom to develop programs locally & they are based on the needs & expressed desires of the people.
12. It is more theoretical.	12. It is more practical & intended for immediate application in the solution of problems.

Differences between formal education and extension education

Objectives of Extension education

The fundamental objective of Extension education is development of the people. Extension education (Agricultural Extension) is primarily concerned with the following main objectives:

1) Dissemination of useful and practical information relating to agriculture, including improved seeds, fertilizers, implements, pesticides, improved cultural practices, dairying, poultry, nutrition, etc.;

2) Practical application of useful knowledge to farm and home;

3) Improvement in all aspects of life of farmers within the framework of economic and social policies of the nation;

Main Principles of Extension education

Extension education has a set of principles that give direction to extension work under field conditions. *Knowing* these principles is a precursor to effective extension / research work. Some of these principles, as related to agricultural extension, are mentioned below:

- Dissemination of useful and practical information relating to agriculture, including improved seeds, fertilizers, implements, pesticides, improved cultural practices, dairying, poultry, nutrition, etc.,
- Practical application of useful knowledge to farm and home, and
- Improvement in all aspects of the life of the farmers within the framework of the economic and social policies of the nation.
- Interests and needs of the farmers are foremost in extension work. These needs and interests differ from individual to individual and from place to place. Therefore, location specific extension programs have better chances of success.
- Cultural background of the people with whom the work is done influences the extension work. The extension worker has to know the level of knowledge and skills of the people, farming practices, indigenous technologies, their customs, traditions, beliefs, values etc.
- Participation is the key principle in extension work. Extension helps people to help themselves. Good extension work is directed towards assisting rural families to work out their own problems rather than giving them ready-made solutions. Actual participation & experience of people in these programs creates self-confidence in them and also they learn more by doing.
- Local leaders help to carry out extension as people have more faith in them. Local leaders can break initial resistance among the farmers about new ideas and technologies
- Whole-family approach in extension including adults, youths, men and women instead of piecemeal approach or separate approaches in extension work is preferred.
- Extension is a co-operative venture. It is a joint democratic enterprise in which farmers co-operate with researchers and extension workers to pursue a common cause.
- Satisfaction is the end-product of all extension work. The ultimate success of the extension work is satisfaction of the farmer, his wife and youngsters as a result of solving a problem, meeting a need, acquiring a new skill or some other changes in behavior.
- Evaluation of extension programs is essential as it measures changes in knowledge, skill, attitude and adoption behavior of the farmers. Merely achievement of physical targets is not enough to show that the extension has succeeded.

The above explanation of the basic concepts of extension shows that Extension education is in a transition stage. The traditional dividing line between research and extension has slowly vanished. Obviously, researchers need to know the basics to extension to be more effective in research.

Check your progress:

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1. Do you agree that researchers need to know basic concepts of Extension education? Why?
2. Discuss with your friends how farmers receive information about new varieties of crops in your area. Write down main points that emerge from your discussion.
3. What is your understanding of Extension education?

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2. Extension Methods - Tools for Reaching Farmers

We have already learned that Extension is an educational process that brings about desirable changes in the knowledge, skills and attitudes of farmers. Since it is an educational process, it involves teaching/training on extension workers' side, and learning on the farmers' side. This process of teaching and learning calls for the use of some specific methods, that are commonly known as extension teaching methods or, simply, the extension methods. Extension methods are used to create situations, in which communication can take place between rural people and extension workers. This situation is known as a learning situation. An effective learning situation requires following essential elements:

- **An extension worker** or a researcher helping in extension work;
- **Learners** (the farmers, the farm women and the youth);
- **Subject-matter or technology** (the recommended improved practices, such as the use of seeds of high-yielding varieties and fertilizers, balanced diet, etc.);
- **Teaching material**, such as a video film, charts, posters radio talk, television program, exhibits, samples, models, etc;
- **Physical facilities**, such as a sitting arrangement for good visibility and easy interaction;

It is for the extension worker to skillfully manipulate these elements for creating a good learning situation and provide satisfactory learning experiences to the farmers.

Extension of new knowledge and skills to rural people involves drawing their attention towards them, arousing their interest and helping them to have a successful experience of the new practice. If we want to teach farmers the advantages of chemical fertilizers and their use, we do this by conducting demonstrations on their fields, showing them, how fertilizers are applied, comparing the yield of the fertilized crop to that of the crop that received no fertilizers. After seeing beneficial effect of fertilizing, the farmer is convinced and motivated to use them regularly.

Classification of extension teaching methods

Simple classification of extension methods will help us understand their functions. There are two ways of classifying these methods:

i) According to their use and nature of contact made with the farmers.
ii) According to their form.

i) Classification of extension methods according to their use:

The extension methods can be used for contacting farmers individually, in small groups or in large groups (in masses). Accordingly, these are called individual, group and mass contact, or community methods:

- Individual contact methods help extension workers make face-to-face or person-to-person contacts with farmers. These methods are very effective in teaching new skills, as extension worker can approach each farmer individually, establish a close contact. Such contacts facilitate good relations between the extension worker and the farmers. Examples of such methods are: *farm and home visits, calls to extension service's office, and telephone calls.*

- Group contact methods enable an extension worker to contact and interact with a group of farmers. The size of the group may be 20 to 25 strong. The group members share a common interest and objective. For example, group may consist of cotton or vegetable growers, or farmers with any other common interest. Formation of such common interest groups is one of the important skills an extension worker is required to have. Using the popular "self-help-groups" (SHGs) is a good example of a group

method in extension work. Small groups facilitate face-to-face discussion of technical problems to chart future course of action. Examples are: *method demonstrations, small group training programs, field days, field trips, discussion meetings, conferences and workshops. Composite / result demonstrations are used as a series of group methods.*

Mass, or community contact methods can be used when the extension worker has to contact a large number of farmers at a time, or over a period of time. This is done to pass on technology or some related information and facilitate usage of the same. The messages are in the form of announcements or a common set of technology to be adopted by large number of farmers at a time. Examples are: *Farmers' fairs, exhibitions, printed literature like leaflets, folders, bulletins, etc, posters, charts, circular letters, television programs, shows, radio broadcasts, etc.*

ii) Classification of extension methods according to their form:

The extension methods may be in three different forms: written, spoken and audio-visual. Written extension methods may use printed or hand-written materials. Spoken materials may be recorded or spoken directly. Audio-visual methods may use projected or non-projected materials.

A brief description of some of the extension methods which are commonly used by extension workers is given below.

a) Farm and home visits

When an extension worker visits the farmer at home or at farm, it is called a farm and home visit. Such a visit involves direct or face-to-face contact by an extension worker with the farmer and/or the members of his family. During these visits, information is exchanged or discussed. The visits may be to get acquainted with problems of the farmers, or to discuss related issues like credit needs, supply of inputs, etc. Such visits provide an opportunity for a two-way communication between farmers and extension workers.

b) Calls to extension service's office, or telephone calls

This method is just the reverse of the farm and home visit. In this case, the farmer comes to the office of the extension worker whenever some personal guidance is needed. The extension worker is able to give personal attention to the problems of the farmer. He may also arrange a mini-exhibition that can be seen by the farmer. It is also possible to hand over extension literature for the visiting farmer. Sometimes the farmer, instead of coming to the office, may like to talk to the extension worker on telephone.

c) Exhibitions

An exhibition is a systematic display of information, actual specimen, models, posters, photographs, and charts and other materials, put in a logical sequence. Its goal is to arouse interest of the visitors in the things displayed. It is one of the best media for reaching a large number of people, especially illiterate or semi-literate. Exhibitions are used to demonstrate a wide range of topics, including model villages planning, improved irrigation practices, soil conservation methods, high-yielding varieties of seeds and plants, and new agricultural implements. Normally, exhibitions are devoted to a specific theme, with all exhibits relating to it.

d) Campaigns

Campaigns are used to focus attention of the people on a particular problem, for example, rat control, village sanitation, plant protection in cotton crop, production of summer crops, etc. It mobilizes the whole community as all are equally affected by the problem or need the same scientific intervention for better crop production. Through this method, the maximum number of farmers can be reached in the shortest possible time. Campaign builds up community confidence and creates emotional linkages between people and the program.

e) Printed literature

Newspapers, magazines, bulletins, leaflets, folders, pamphlets and wall news sheets are the mass tools media that may enable communication of information to a large number of literate farmers. These are used to communicate general or specific information related to transfer of technology or a practice. Small folders, leaflets and pamphlets are used to give specific recommendations about a practice, such as: use of fertilizers, plant protection in cotton crop, vegetable cultivation, and growing of crops like wheat, barley, maize, etc

f) Radio

It is a mass medium of communication that can reach a large number of people at any given time involving the least expense. Extension workers may use radio for communicating information on new methods and techniques, giving timely information about pest and disease control, weather forecast, market news, etc. For this purpose, talks, group discussions, as well as certain creative performances are usually arranged.

g) Television

It is one of the most powerful media of communication. It combines both audio visual impact and is most suitable for dissemination of agricultural information. It is more useful in teaching how to do a specific job.

h) Video

Video is an effective tool for arousing interest among people because it involves seeing, hearing and action. These are the most suitable medium for drawing bigger audience. A film show can be followed by a discussion with the farmers.

You must have noticed that some of the important extension methods have not been covered in this section. This has been done to give special emphasis on these methods separately. Exclusive sections have been devoted to *method demonstration, result demonstration, group meeting and field day*.

Selection of extension methods

Which extension method has to be used, and when, needs careful consideration. It depends upon:

- Age, education level, profession, interests, expertise and other parameters of the audience.
- Subject matter to be communicated to the farmers,
- Expertise of the extension worker e.g. a good speaker, a good writer etc,
- Resources available with the extension worker,
- Stage (awareness, interest, conviction, trial and adoption) of the adoption process.

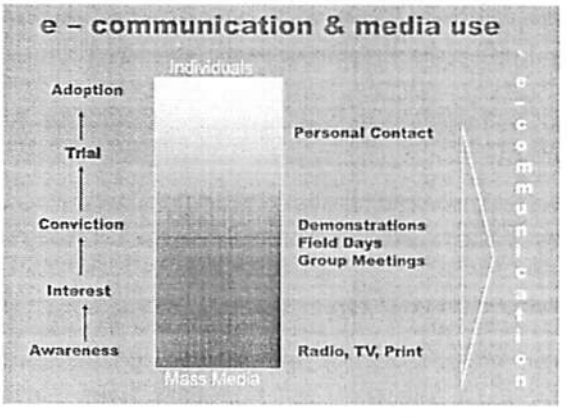

Figure 4. Electronic communication and media use

Summary

A wide variety of extension methods are available to the extension workers so that they could reach the farmers in an effective manner. You can reach them more systematically if you have basic knowledge of these methods. The all-important learning situation needs a close look so that full learning could take place. However, selection of a proper extension method depends on some considerations of other elements of the learning situations. These may be nature of technology to be transferred, profile of the farmers, resources and facilities available, etc. Obviously, there is no single extension method that would be effective in all possible situations. Thus, trying different extension methods or combining them in order to find best solution for a specific case is strongly encouraged.

Check your progress:

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1. Prepare a table to show different extension methods according to their form.
2. Which extension methods will you use in popularizing a new wheat variety in a cluster of farms?
3. Collect extension literature of different forms and study the content and the format.

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3. Experiential Learning Cycle (ELC) and Extension Tools

The latest development in the field of extension is involvement of the people for whom extension work is being done. "Participation" of the people has become one of the guiding principles in farm research and extension. Rich experiences of the farmers help in developing usable technologies and conducting effective extension work. Here is a potent tool to tap experiences of the farmers in a participatory mode to enrich participatory research process and extension work especially training. This participatory method is a great asset in conducting effective training programs that most of the scientists are required to conduct. Many extension experts and trainers have accumulated a store of practical knowledge in this area that may help researchers and extension workers alike.

Experiential Learning

When your extension activities provide farmers with the opportunity to experience rather than to be told what they are to learn, you are providing experiential learning. This is also known as "discovery learning", "experience-based learning", "action learning" and "interactive learning". The highlights of the experiential learning are as follows:

- Emphasis is on content and process of learning.
- Focus is on participation and involvement of farmers in the process of learning.
- Extension worker/researcher is a resource person, a facilitator and a trainer.
- Climate for learning is informal, relaxed, encouraging and status-reducing.
- Extension/research worker's concern is to stimulate the group members to think deeper on problems and solutions.
- Farmers are responsible for their own learning.

Experiential learning has been successfully used as a training tool as well. You as a researcher would be required to organize training programs for farmers and other professionals who are interested in working with farmers. This is the likely method you may use in the conduct of field demonstrations (including on-farm trials) and using the same for training the farmers on the use of technologies demonstrated by you. This knowledge will make your use of various extension methods more participatory. Therefore this section on experiential learning is of great importance in research and extension.

Trainers who give effective training sessions have mastered the use of *Participatory Training Methods.* There is a strong trend towards "experience based" or "experiential" training methods. These methods have proved equally effective with farmers and extension professionals. Protagonists of participatory training methods give the following reasons for their choice.

1. Adult learner (farmers and SMSs) want to be involved and participate in the research and extension process. They do not want to sit and listen. They look for application of their learning in life situations. At the same time they want to be treated with respect and dignity.
2. Human beings are uniquely capable of personal and collective growth, self-determination and transformation.
3. There is a trend towards participative management. Adult learners have needs and values that are related to self-development. They do not like tests, grades and over load of theory.
4. Brain research has revealed that people are not only logical and rational (left brain thinking) but also have a capacity to be spontaneous and creative (right brain thinking)

The Experiential Learning Cycle (ELC)

How can learner use his/her experience in training situation? Effective training situations that incorporate learner's experiences provide opportunities for a person to engage in activities, review these activities critically, draw some useful insight from the analysis and apply the results in a practical situation.

ELC is a step-by-step model of how adults learn new skills and gain knowledge. A graphic presentation of ELC is given here (James McCaffery, 1986). The four phases are arranged in a sequence in a circular format. This sequence shows that the process of experiential learning is never ending. The four phases are as follows:

Experience phase: At this phase the participants are actively involved in "doing" some activity. Activities may be lectures, case studies, role-plays simulations, games, films and slide shows, skill practice, preparing an equipment, etc. These activities range from active to passive techniques. The trainer may choose any of these activities according to the learning objectives set for the training.

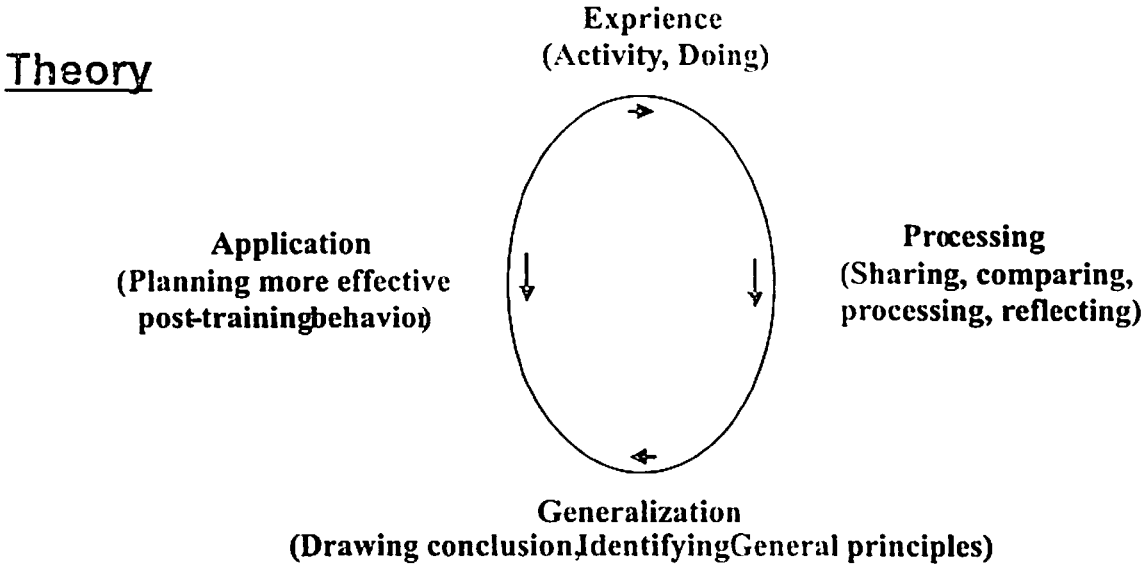

Figure 5. Cycles of the experiential learning

The Processing phase: This is the second phase in the experiential learning cycle. In this phase, the trainer helps individual member recall and share the experience undergone in the first phase. The participants now express what they like or dislike about the experience, what was easy or difficult about it and how they felt about it. They discuss individually or in-group both their intellectual and emotional reactions to the activities in which they engaged in the first phase.

The Generalization Phase: In this phase the participants draw conclusions and generalizations that might be derived from the first two phases. Question like "what did you learn from all this?" helps in drawing generalizations. The trainer moves the discussion away from the immediate experience and to the broader world of learning.

The Application Phase: This phase is concerned with the application of the knowledge achieved during the whole process. Drawing upon insights and conclusions reached, the participants can begin to incorporate learning into their day-to -day behavior. The trainer helps them think about what they are going to do when the training session is over. There is a focus on specific actions back on farm and home.

Theory in ELC: Technical information also has a place in the ELC. This information called "Theory" may be put into the ELC before "Experience phase". Trainer may use traditional method of providing technical information that may be followed by the "Experience".

Throughout the ELC process, the participants think creatively and the trainer prompts thinking by asking relevant questions at every phase. It is useful for skill training because it involves the participants in skill practice. They can draw own conclusions and identify applications.

Seven-Step Model of Presentation

Well- trained and experienced trainers can use ELC with a great effect. However, the ELC structure can be easily understood and used even by inexperienced trainers, if properly practiced. One important application of the ELC is the "Seven-step model of presentations" which has universal application in all extension and training methods. The seven steps are the basis of all presentations that a trainer plans as a part of participatory training. They can also be used while conducting field demonstrations, field days, group meetings, etc., they are as follows:

1. Climate setting
2. Setting learning objectives
3. The experience
4. Processing of experience
5. Drawing generalizations
6. Application of generalizations
7. Closure

It may be seen that these seven steps follow the same phases/steps as in ELC with three added steps viz. climate setting, setting learning objectives and closure.

Climate setting is an activity performed at the beginning of a training session. It shows the participants that the training is important and relevant to them. This activity helps both, the trainer and the learners to tune themselves to the main topic of training. It also helps the trainer to prepare a comfortable ambience for training.

Learning objectives identify what participants will have gained at the end of a training session; the knowledge, the skill or attitude obtained as a result of having participated in the training session. There are knowledge objectives, skill objectives and attitude objectives.

Closure is a terminal training activity performed at the end of a training session. It summarizes the experiences gained and calls for action.

Summary

Training prepares people to perform specific tasks in an organization. It is a continuous process as technologies change and so do the organizations. There is an emphasis on participatory training methods in all development programs, which takes into account physical and psychological requirements of adult learners. The ELC is a potent tool in the hands of a trainer (may be a scientist or an extension expert), which involves the participants throughout the learning process. The participants can draw their own conclusions and identify application of the knowledge.

The ELC can form the basis of all presentations in often-used training methods. The seven-step model can be used with greater impact than a traditional method of presentation without climate setting, learning objectives and an effective closure.
See ELC Game at Appendix1.

Check your progress:

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1. Discuss with your friend how you had learnt tractor driving. Was it an experiential learning?
2. List out the possible uses of the seven-step model.
3. How did you perform in the ELC game? If you committed any mistakes, could you correct those mistakes now?

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4. Conducting Effective Agricultural Demonstrations

One of the main objectives of a researcher is to develop technologies that are acceptable to farmers. It is useful to know whether the newly developed technology is worth adoption or not. One good way to do this is through well-planned and carefully-conducted demonstrations. Fortunately, one of the major objectives of the extension worker is to disseminate new technologies among farmers. On-farm demonstrations serve as one of the most effective Extension education tools ever developed.

Demonstrations should not be casually developed or implemented. Instead, as their name implies, these should have predictable outcomes based on a research foundation. Demonstrations should illustrate the application of appropriate technology, that is, technology that fits the local set of conditions. When this occurs, the maximum learning will result from the resources invested.

Because the best demonstrations are localized, it is not easy to present a ready-made procedure of conducting the same. However, what makes a demonstration successful can be listed, a scientific methodology can be suggested, and some examples of successful demonstrations presented. The researchers will have to devise their own methodology within the objectives to be achieved and the local requirements.

How demonstrations developed

It is important to know the background of the development of demonstration as an extension method. This will help you to plan your own demonstration strategy on sound lines. The need for demonstrations was first recognized nearly a century ago by Seaman A. Knapp, an Extension pioneer. Knapp's theory was that farmers would not change their methods as a result of observing farms operated at public expense, but that demonstrations conducted by farmers themselves on their own farms under ordinary farm conditions were the answer. In Knapp's words, "What a man hears, he may doubt; what he sees, he may also doubt; but what he does, he cannot doubt."

In 1903, Knapp proved his point through a famous demonstration. This demonstration included a small farm in Texas; USA where Knapp planted half with corn and remaining half in cotton. The purpose was to illustrate the effects of using different seed varieties, fertilizers, methods of planting, and cultivation. The farmer made $700 more than might have been expected and the demonstration was a success.

Then the opportunity came to use demonstrations on a broad scale in the weevil-infested areas of Texas and two adjoining states. Knapp demonstrated improved cotton growing methods. With a $40,000 budget, he directed more than 20 federal agents who worked with some 7,000 farmers to establish demonstration plots. This marked the beginning of demonstrations in the Cooperative Extension Service. (John Hancock, 2000)

"What a man hears, he may doubt; what he sees, he may also doubt; but what he does, he cannot doubt."

Seaman A. Knapp, Agriculture Extension pioneer

Demonstration Types

For the sake of clarity we may divide the demonstrations into two categories. These are result and method demonstrations. The distinctions between the two types are not always clear since many demonstrations incorporate aspects of both types. Normally, result demonstrations are long term and demonstrate the worth of the technology by producing better results in terms of yield or performance of the crop on other dimensions. On the other hand, a method demonstration is usually a short term demonstration that shows a process of performing a practice.

Does it seem to be a hypothetical difference between the two types of demonstrations? In fact, there is a third type of demonstration that is a combination of the two types. This is called a composite demonstration. It is a combination of result and method demonstrations. The following explanation further clarifies the types of demonstrations.

Result demonstration It is a single purpose demonstration. The demonstration depicts cause and effect relationship between the new technology and the end result. It is designed to show that application of fertilizers gives better yield of wheat than no use of fertilizer. The farmer and his neighbors get convinced of this technology only when they see the final stand of the crop and the yield obtained at the end of the season. Proper records have to be maintained to compare results at the end of the demonstration.

Method demonstration is designed to show how fertilizers are applied in the field .This is a process-based demonstration that could be completed within an hour or so. Emphasis in this type of demonstration is on teaching a skill or to show "how to" perform a skill. The farmers would learn the method of application of fertilizers to the wheat crop or how to spray a fungicide in the wheat field. The demonstrator is accepted by the farmers as an expert.

Composite demonstration aims at demonstrating a) the whole process of growing a better crop in the form of a package of practices and b) showing the result in terms of yield obtained at the end of the season. The package of practices is in the form of a series of practices that could be demonstrated in a method demonstration mode. For example, cultivation of a good crop of wheat may include method demonstrations on selection of a good quality seed, preparation of a good seed bed, sowing with a seed drill, fertilizer application, and preparation of a fungicide solution, spraying of fungicide in the field, harvesting technique, and several steps in post-harvest technology.

Multidisciplinary and interdisciplinary demonstrations

A single technology demonstration may be a simple one-discipline demonstration. For example, a varietals demonstration of wheat crop is a single discipline demonstration. However, most of the present day demonstrations are either interdisciplinary or multidisciplinary in nature.

One-discipline demonstrations may involve subject matter or relationships within a single discipline. A method demonstration of maintenance of a tractor is an example of this type of demonstration.

Multidisciplinary demonstrations involve individuals from two or more different disciplines working on a common problem. Although the problem is the same the potential solutions are individually planned, implemented, and evaluated with little or no consideration of the other disciplinary approaches to the problem. Example: controlling a disease in a crop. One discipline would suggest crop rotation as the solution, another would recommend using a resistant variety, and a third approach would be to use both preventative and curative fungicides. In each case a particular disciplinary view was taken.

Interdisciplinary demonstrations involve a team approach, with individuals from different disciplines working together in an effort that is mutually planned, implemented, and evaluated. An interdisciplinary demonstration takes into account most of the possible cause and effect relationships that might be experienced. For example, watershed management demonstration. The agronomic input would include the crop types to be used, the fertility recommendations, and the water management input would be in the form of land utilization and water conservation methods, a forage expert is needed for efficient forage utilization, the engineers would construct the most practical fence, animal scientists would provide insight into the description and management of the cattle using the pasture and agricultural economists would help determine the technology's benefit-cost ratio, profitability, etc.

Frontline demonstrations are organized by the research system for the benefit of extension agencies and progressive farmers. The objective of these demonstrations is to demonstrate the worth of a newly developed technique or a variety or a process first to the extension agencies and

progressive farmers so that they in turn further disseminate the techniques to the whole farming community. The techniques demonstrated are the results of latest research findings developed by the researchers. These techniques are so called, 'fresh from the oven'. These demonstrations are largely used in India and other developing countries, in different contexts.

Whole-farm demonstrations

Each of these types of demonstrations discussed above is appropriate in particular situations. Indeed, sometimes a simple demonstration is the most effective. But in general, the most effective extension demonstrations are interdisciplinary that often require more planning and may involve more people.

Although interdisciplinary demonstrations are more desirable, these are difficult to coordinate. Special efforts have to be put into coordination of several experts involved in the demonstration. Some mechanisms have been developed in the countries where such demonstrations are organized on a large scale.

How to conduct an on-farm demonstration

On-farm demonstrations are simultaneously used for extension and research purposes. On-farm-research is a problem-oriented approach to agricultural research that begins by diagnosing the conditions, practices, and problems of particular groups of farmers. Once the problems are identified, a research-cum-demonstration program is designed to address them. A key part of any such program is conducting experiments or demonstrations on farmers' fields under farmers' conditions and management. Those experiments are then evaluated using criteria that are important to farmers, and the results are often used to make crop production recommendations.

Some extension experts make a clear distinction between a demonstration and a trial or an experiment. According to them a demonstration is conducted only to demonstrate the superiority of a proven practice. However, in such situations where extension systems are yet to fully develop, the research-cum-demonstration programs are needed.

The process of conducting on-farm demonstrations can be divided into the following six steps:

1. Identification of problem
2. Planning the demonstration
3. Establishing demonstration
4. Laying out of demonstration and management
5. Evaluation of demonstration
6. Recommendation and diffusion of results

Each step must be included and the steps must be followed in the pre-determined sequence.

Step 1. Identification of problem

As a first step the extension worker has to identify problems that limit farmers' productivity and possible ways to solve them. This step involves collecting and analyzing information to design on-farm demonstrations. Activities may include a review of secondary data, informal farm surveys consisting of farmer interviews and field observations, and formal surveys with a questionnaire.

The first step is the designing stage. At this stage the purpose is to gather enough information to describe the basic features of the research area, to identify problems that limit farmers' productivity, and to begin considering possible improvements in farmers' practices.

The information collected from the diagnostic activities can be used to design the on-farm demonstrations. The diagnostic activities should not end even after the first on-farm demonstrations are planned. Many on-farm demonstrations are designed for diagnostic purposes, and during the demonstration stage the need often arises for further diagnostic activities, including observations and formal studies.

Step 2. Planning ***the demonstration***

Demonstration planning normally involves the following activities:

i) Formation of a Guidance Committee

Planning a demonstration may begin with the formation of a guidance committee. The committee should consist of extension staff, agents, specialists, concerned farmers, local dealers, and other cooperating individuals who will help do the work.

Good judgment is essential in selecting a guidance committee. This committee should be made up of people in the community who are progressive and well acquainted with the problem being addressed in the demonstration. Select people who possess leadership qualities and at the same time are able to spare time to help gather support and attend meetings. To enhance the success of any demonstration this committee must clearly define the goals of the demonstration. Everyone involved needs a conceptual model of the demonstration and needs to know exactly what is expected of each of them. Use this committee to advise you on demonstration needs and finding a suitable cooperator (the cooperator is often a committee member). Not everyone can be selected for intensive demonstrational efforts; so, although the individual selected as the cooperating farmer may benefit more in the short run, everyone in the community benefits in the long term.

ii) Choosing a Demonstration Topic

One very important responsibility of the guidance committee is topic selection. The demonstration topic must fit a definite need of the farmers. It should be realistic, relevant and manageable.

A topic is *realistic* simply because the original problem statement must be based on factual evidence. A review of literature relating to the chosen topic may yield helpful demonstration ideas. Also, the literature review may produce a solution to the actual problem.
problem.

Make sure that the demonstration is addressing a *testable* topic or problem statement. Testability can be determined by collecting and analyzing information relevant to the demonstration. If no relatively current information is available the objective of the demonstration may be hypothetical.

The topic should be **manageable.** Avoid the tendency to work at extremes. Don't work on problems where the outcome is highly predictable and has little or no impact or on large problems that are unmanageable.

Example: Sustainable Agriculture

The following is an example of topic selection for demonstrations in sustainable agriculture. Remember, these are just examples of how the demonstration guidance committee can select a topic. (This list is based on information from Alternative Agriculture, National Research Council, 1989):

- *Crop rotations that mitigate weed disease, insect, and other pest problems; increase available soil nitrogen and reduce the need for purchased fertilizers; and, in conjunction with conservation tillage practices, reduce soil erosion.*
- *IPM, which reduces the need for pesticides by crop rotation, scouting, weather monitoring, use of resistant cultivars, timing of planting, and biological pest controls.*
- *Management systems to control weeds and improve plant health and the abilities of crops to resist insects, pests, and diseases. oil and water-conserving tillage.*
- *Animal production systems that emphasize disease prevention through health maintenance, thereby reducing the need for antibiotics.*

iii) Selecting a demonstrator farmer

Once the topic has been selected the next step is to select a demonstrator farmer and a suitable demonstration site. The success or failure of a demonstration may well depend on the selection of a right kind of farmer who will see the demonstration through. Much depends upon the ability of the committee/extension worker to locate a person and a situation that meet acceptable demonstration criteria.

Here are some criteria for selecting a demonstrator farmer:

- **Use volunteers as demonstration farmer.** A volunteer is more likely to be more enthusiastic and successful in the demonstration process.
- **Select dependable and honest farmer.** He should be a respectable person in the community. Otherwise, you may find yourself with a good demonstration that nobody believes.
- **Use a leader.** Selecting a community leader would be an added advantage.
- **Use a typical farmer.** Demonstrations work best when the demonstrator farmer represents the farmers' community you are trying to reach. For example, demonstrations directed at middle-income families should be conducted with middle-income farmer.
- **Select a farmer who is in need of help.** The most successful demonstrations are conducted on farms where dramatic improvement can be demonstrated. The demonstration is less likely to be useful if the farmer is already an expert on the topic.

Remember, the perfect demonstrator farmer is probably impossible to find. However, it is better to have an imperfect demonstrator farmer than to have no demonstration at all.

iv) Select an accessible demo site

Locate the demonstration in an area that is accessible to farmers who need its information. Consider as many factors as necessary to select an appropriate site. It is better to locate the demonstration near a road that is frequently used by the farmers. In addition to this, it is difficult to give a prescription for selecting a good demonstration site. It ultimately depends on the topic that you have selected for the purpose. Site for an agronomy-based demonstration will differ from a watershed management demonstration site or a forage crop demonstration site.

While selecting a desirable demonstration site for an agronomy-based demonstration the following considerations may be kept in mind. This is just an example.

Example: Selection of site for demonstration of

Fertilizer application, *- select a typical soil type with a known deficiency of nutrients. One treatment in a fertilizer demonstration should be according to soil test recommendations. If you obtain a soil test early, you will have enough time to select a site where you are most likely to achieve a response to a certain nutrient.*

Herbicide application, *- select a farm infested with a significant number of the most common weeds so that farmers may properly evaluate the practice.*

New varieties adoption, *- site should be selected where differences in variety characteristics can be measured. Variety demonstrations are usually conducted to show superiority of the new variety in terms of yield, quality, lodging resistance, or tolerance to insects or diseases.*

v) Arrange inputs for the demo

After the selection of the demonstration farmer and the site, it is time for arranging necessary inputs like seed, fertilizers, equipments, pesticides, etc. It is better to prepare a list of all the supplies required along with time frame. Who should pay for the inputs? This depends upon the status of your extension program and economic condition of the farmers. In all developing

countries the inputs are supplied by the extension agencies. However, the demonstration farmer may not always expect free inputs from the extension worker. In other words, the farmer should not participate for the sake of receiving free inputs.

Whenever a demonstration is conducted it is a good idea to obtain the cooperation of your local farm supply agencies and dealers. Community agri-business organizations are generally anxious to help and be of service to the farmers. Their assistance will provide valuable support for your program. Furthermore, through this cooperation you can obtain the necessary items, inputs, and supplies for your demonstrations. If you do not establish a reliable source for these materials, conducting demonstrations can become a difficult task.

Be sure to give adequate public recognition for services and materials obtained from your local agribusinesses. A pat on the back to those who help you goes a long way, and is one more factor in a successful demonstration.

Step 3. Establishing the demonstration

Now is the time for planting the crops in the demonstration. Planting is done according to the objective of the demonstration. Your objective may be to test and verify technical recommendations or demonstrate recommendations to the farmers. Depending upon the plot size, there are two types of planting methods that can be followed. You may either have a *small plot* design or a field *strip design.*

A *small demonstration plot* may be 1/20 acre or 1/10 acre in size. Small plots are better if the crop has to be harvested or there are large numbers of treatments included in the design. If replicated, small plots offer the best opportunity for reliable interpretation of the data. These plots are also advantageous when seed fertilizers, etc. are in short supply.

Field strips are preferred for the sake of convenience to the demonstrator farmer. These strips facilitate use of equipments, application of fertilizers, spraying and dusting of chemicals, etc. Avoid border effect in case of fertilizer demonstrations.

Yield from two or more identical treatments is more reliable than the yield from a single treatment. For this purpose even conducting similar demonstrations at several locations gives more information and data. By doing so you may even reach more number of farmers. But you may find it difficult to supervise these demonstrations.

Step 4. Laying out of demonstration and management

According to research and extension experts it is desirable to organize a composite demonstration that includes the whole package of practices of growing a crop. Normally such demonstrations include two treatments only. One is the farmer' current practice and the other is the set of new practices. The part of the demonstration that has the farmer's practice is known as the *'control plot'*. The farmers can compare the results obtained in the control plot and the demonstration plot.

Layout of a demonstration

Control plot ***1/10 acre or 1/20 acre*** ***(Farmer's practice)***	***Demonstration plot*** ***1/10 acre or 1/20 acre*** ***(Improved practice)***

One-plot demonstration

The latest trend among the scientists and the extension workers is to organize one-plot demonstration instead of having a control plot. Normally, control plots help farmers in making comparisons between the traditional practice and the new practice. However, in the one-plot

demonstration there is no separate control plot but memory of the demonstrator farmer and the neighboring farmers is considered as a control. They compare the production of the demonstration plot with all that they had seen in the past.

The famous "National Demonstration Project" (NDP) of India is a one-plot demonstration. Several such demonstrations are organized in the country with different crop rotations of cereals, pulses, etc. Those scientists who developed the new varieties of cereals and pulses themselves demonstrated the technology in the farmers' fields. The objective was to achieve a target yield of 9 tones/ha in one year for a two-crop rotation and 11 tons/ha for a three crop rotation. This is how the farmers developed faith in the new technology.

The NDP successfully proved the production potentials of the new varieties and production technologies of cereals, pulses and oilseeds through several one-acre demonstration plots scattered all over the country. These demonstrations were conducted under varied agro-ecological conditions on good quality soils and problem soils. The scientists themselves operated the new technologies on farmers' fields and collected feedback from the farmers.

Entire Farming System demonstrations

A new initiative under NDP was the organization of some "entire farming system" demonstrations of three years duration each. These demonstrations included a mix of different technologies, including animal husbandry, vegetable cultivation, bee keeping, etc. However, coordination of these various technology streams, even on a single farm unit, proved to be difficult. In the end, no specific small farming models could be developed and replicated.

Harvesting

When the crop is mature, it should be harvested. Preferably it should be done in the presence of the guidance committee and groups of farmers. The committee can make a visual estimation and expected yield by looking at the standing crop. Harvesting and weighing of the produce should be done in the presence of the farmers. This will remove doubts about the better yields you are likely to obtain.

Record Keeping

It is very important to keep proper records of all that is being done on the demonstration farm. The records may include details of all the inputs used with dates and quantities, dates of all the practices followed including irrigation, intercultural operations, fertilizer application, etc, visit of different scientists to the demonstration plot and the harvesting data.

Organize Field Days

As demonstration is an educational activity, it is imperative that it may be used as a tool of educating farmers about the new practices demonstrated. Although the demonstration site can be seen by the neighboring farmers any day, it is better to organize a special day when the farmers may be invited to witness the demonstration. There are three occasions when field days can be organized:

1) At the time of sowing the demonstration.
2) Once during the crop season when the lush green crop is standing.
3) At the time of harvesting the demonstration crop.

Details of the field day as an extension method have been given separately.

Step 5. Evaluation of demonstration

Check the demonstration from time to time. If unusual results show up, contact a state Extension specialist who may be able to explain the odd results. Carefully analyze the results of all on-farm demonstrations. Even if the demonstration failed, you can learn a lot

by discussing the results with everyone involved and trying to pinpoint the weaknesses. By learning from your weaknesses you will strengthen your chances of future success with this effective extension tool. Each analysis should include an assessment of farmers' reactions and opinions, a general interpretation of the results, and statistical analysis, if appropriate. All results can be used to plan future demonstrations and make recommendations to farmers.

Step 6. Follow-up of demonstration

The demonstration does not end with the harvest of the crop. The extension role of the scientist/extension worker actually begins now. The extension workers participate in the entire process and so are able to transfer recommendations to farmers with skill and confidence. When farmers are actively involved in on-farm demonstrations, they act as an avenue for further spread (diffusion) of new technology. By monitoring farmers' opinions and use of new technologies, workers can improve their understanding of farmers' needs and preferences.

Publicity is an important factor that influences the success or failure of any demonstration. Publicity should start during the planning stage and continue until all demonstrations are concluded. Invite mass media to provide wide publicity. Print a folder that contains all the details of the demonstration.

Sign boards may be placed at the site of the demonstration plot in the beginning only. The board may be of 4 feet x 3 feet if the plot is small and 6 feet x 4 feet if it is bigger. Some of the relevant information about the demonstration may be put on the board like:

- Crop with variety
- Crop rotation followed, if any
- Date of sowing
- Treatments
- Fertilizers applied (names of fertilizers and quantities of NPK)
- Irrigations given with dates
- Plant protection measures taken
- Inter-cultural practices followed
- Harvesting
- Yield

You may now prepare a list of farmers who plan to adopt the new technologies demonstrated by you. Make it a point to meet them and help them if they need any clarification. They may need your help in buying some inputs that you may arrange.

Goals for effective demonstrations

- *Keep farmers' interest in mind*
- *Farmers should understand purpose of demonstration*
- *Begin with simple demonstrations*
- *Repeat demonstrations for better effect*
- *Let farmers participate in demonstration process*
- *Demonstrations are eff ective when they deal with real problems and give practical solutions*

Summary

Agricultural field demonstrations are an important part of the agricultural development in any agricultural system. These demonstrations when properly conducted make research and extension work more meaningful and rewarding. Even researchers who mainly work for conducting field trials and adaptive research will find demonstrations a useful method of getting opinion of the farmers for whom they are working. You have several options to choose from a variety of methods of conducting demonstrations. The process, however, has to be followed to develop desired results. Different types of demonstrations have been explained above and your role has been specified. In

all nine steps have been recommended to be followed for organizing a good demonstration. Follow them and help farmers grow better crops.

Check your progress:

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1. Which field demonstration did you organize last year that you think was a success? Why did it succeed?
2. Discuss on paper a plan to organize a wheat crop demonstration on new package of practice. Include all the steps in conducting the demonstration.
3. Prepare a performance to collect data of a composite demonstration.

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5. Interactive Method Demonstrations

A method demonstration is a short time demonstration presented before a group of farmer audience to show how to carry out an entirely new practice or an old practice in a better way. It is essentially a skill training where the emphasis is on effectively carrying out a job, which shall improve upon the result. It involves seeing, hearing, participating and practicing in a group. It is some times used along with a result demonstration. The method demonstration helps in building confidence and satisfaction of the farmers. It is the oldest form of training. Men taught their children how to hunt; how to cultivate; how to survive - through forms of the method demonstration - long before writing and probably even before language itself developed. Learning by this process seems almost instinctive. In the jungle the tiger kitten learns to hunt by following and playfully mimicking the stalking tigress.

Method demonstration is termed as "interactive" mainly because it is an activity that involves both, the demonstrating expert and the audience in the process. It is not a one-way communication but a two-way interaction through out the demonstration. The audience is not passive listener and viewer of the demonstration but they ask questions, participate in the process and take up responsibility in the conduction of the demonstration.

In the method demonstration, we show how to do a job step-by-step, like treating a bag of seeds with fungicide, planting seed in lines or using a mechanical duster to control insects. For a successful method demonstration follow the steps given as under.

Plan and prepare

1. *Define carefully the purpose of the demonstration*. Every demonstration method has a purpose. The extension expert sets some objectives before him/her that have to be achieved through the demonstration. Test these objectives against factors, such as whether or not the practice really is important; whether or not people can afford to follow it; whether or not supplies and equipment are available in sufficient quantities to permit its widespread use.

2. *Gather all of the information you can find about the practice*. The method demonstration has to be technically correct that gives authentic and usable information to the audience. Therefore, it is important to consult subject matter specialists and ensure their participation in the demonstration. While it is important to involve scientists in the demonstration process, the extension expert also need to thoroughly familiarize himself with the subject matter and, if possible, with the research results.

3. *Talk over the problem with a few village leaders*. The method demonstration is a participatory process. Therefore, you can ask audience to help you plan the demonstration. This is an important step because it establishes your liaison with the village; secures leader approval of the project; provides land and other essentials for the demonstration; is an actual teaching opportunity since the leaders are certain to learn more about the practice as they discuss it and help plan the demonstration. It is also helpful because this method involves more persons in the demonstration which encourages wide-spread discussion of the project.

4. *Gather all of the materials you will need*. Materials would include everything farmers will need in order to apply the practice on his farm. This would depend upon the subject of your demonstration. If it involves use of inputs like seed, fertilizers, etc, arrange them in advance.

5. *Plan your presentation step-by-step*. Include 'introductory' and 'summary' portions in your demonstration process.

6. *Whenever possible, rehearse the presentation two or three times.* Rehearse until you are thoroughly familiar with steps and know exactly what you want to say or do at each step of the action. Rehearse for the 'time' you would require for the demonstration.

7. *Decide on date and time* - This is better done in consultation with the local leaders and farmers. Give timely intimation to all the concerned.

8. *Display* all the diagrams, posters, charts, etc you have prepared for the demonstration.

Present the demonstration

1. When the audience gathers to watch the demonstration, *explain what you are going to do*; why it is important for them to learn the new method; ask some persons among the audience to help you with different tasks.

2. *Go through the demonstration*. Explain it step-by-step. Pause to answer questions from the audience. Repeat key words and difficult steps. Use visual aids to make your demonstration interesting and informative. In the method demonstration, actual materials, equipment and people are the best visuals to use.

3. *Check the effectiveness of your instruction* by having members of the audience do one or more of the steps. In an ideal situation each person would have an opportunity to practice each of the steps in sequence until the skill is thoroughly learned.

4. *Summarize* the importance of the practice, the steps, the supplies and equipment needed. Distribute illustrated folders or other literature showing the step-by-step procedure.

Follow-up

1. *Enlist the names of all the participating farmers* and maintain contact through field staff or personal visits.

2. *Assist the participating farmers* in getting the required materials and equipment whenever they decide to adopt the practice that has been demonstrated.

Often the method demonstration paves way for the result demonstration and in such cases both should be considered as parts separated only by time. An example would be a method demonstration of fertilizer placement to be followed by a result demonstration as the crop matures.

Check your progress:

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1. *Prepare a plan for conducting a method demonstration on use of seed-cum-fertilizer drill. (Trainers may use it as an exercise).*
2. *Recollect a good method demonstration that you have seen. What were the plus points in it?*
3. *Enlist the points on which a method demonstration should be evaluated.*

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6. Organizing Field Days

This method is mostly used along with field demonstrations. Organizing a field day is not merely collecting some farmers at the plot. It is an educational opportunity where participating farmers learn the details of the demonstration and the method used by the demonstrator-farmer and the extension worker. There are at several occasions when field days can be organized on the field demonstration site. Depending on the need and the resources available with you, the number of field days may be decided. Here are some opportunities for you to arrange a field day:

- At the time of preparing the land and laying out the field demonstration.
- When the demonstration crop is being sown.
- Mid-season, when the crop is standing green in the plot.
- At the time of harvesting/weighing the demonstration crop.

Field day is a method of motivating the farmers to adopt a new practice by showing what has actually been achieved by applying the practice under field conditions. A field day may be held on a demonstration farm or a research farm or even a home. Normally, the appropriate size of audience for a field day is 20 to 25 persons. In case the number of farmers is more, you may divide the group and make them visit the location in rotation.

Purpose of the field day

- To convince the farmers about the application of the practice on their own farms.
- To motivate them to adopt the practice by showing its performance and profitability under field conditions.
- To remove doubts, superstitions and unfavorable attitude about the new practices.
- To reinforce previous learning about the new practices.

Method of conducting a field day

Whether the field day is being arranged at a demonstration site or a research station, the methodology is the same:

Planning and preparation

- Decide about the location of the field day. Usually it is the demonstration that you have organized on a farmer's field. The demonstration should have sufficient amount of information and visible evidence of better practices that you have demonstrated.
- Decide upon date, time of the field day. Send invitations and/or make wide announcement of the event. Better invite those who are directly interested in the technology being demonstrated.
- Contact the subject matter specialists and invite them to be present. Normally these are the specialists who have been associated with the process of demonstration. In case you are that specialist, prepare well to answer the farmers' queries.
- Arrange a place of meeting on the demonstration farm itself. Select a flat place where many farmers could sit comfortably and also see the demonstration crops.
- Arrange a shade in case it is too hot or if rains are expected. Put a colorful cloth banner announcing the field day. Also have a prominent place for seating specialists, etc.
- It is always desirable to arrange a small exhibition showing the salient features (including photographs and simple charts of different stages of the crop) of the demonstration and related technologies. This will supplement the demonstration effort.
- Arrange to prepare a special handout that contains all the relevant information about the demonstration. Farmers will appreciate this gesture and keep it in record.
- Do not forget to invite the media men (radio, television and press) as they will give wide publicity to the technologies being demonstrated. Let other farmers also take advantage of your demonstration.
- Make arrangement for registration of the participating farmers so that you could follow up with them and also account for the expenditure incurred on the field day.
- Arrange a public address system, vehicles, etc. for the occasion.

- Make a written program and divide the responsibility among your colleagues.
- Arrange light refreshments for every body present.
- Invite an important person (a scientist or a farmer leader) to the field day. This will make your field day important.

Conduct the field day

- Assemble the farmers and welcome them on arrival. Give a short introduction about the purpose of the field day and indicate that the field day is an informal educational process. Also explain the program in brief.
- Let the demonstrator farmer explain what has been done on his plot. This will make the field day a real local experience. The visiting farmers will attach more importance to what their friend will tell them. You as a specialist may support his presentation and also give technical details when ever required.
- Let the farmers move to the plot in small groups and see for themselves what has been done on the plot. There should be some body to explain the details of the demonstration. This has to be done as per the stage of the crop at the time of the field day.
- On the completion of the visit, make every body seated at the meeting place. Distribute the handout, if prepared.
- At this stage you as an expert and the guests may like to speak to the farmers. Emphasize upon the salient features of the demonstration again and invite questions. As far as possible, let the demonstrator farmer reply to the questions raised by the farmers. You may intervene at suitable occasions.
- Invite a few visiting farmers to give their reactions on the demonstration. If there are still some questions, provide answers.
- Ask the visiting farmers what did they see in the demonstration and what is their reaction to the technology demonstrated. Make generalizations on the basis of the discussion.
- Ask how many of them would adopt the practices demonstrated and why or why not. This is the application stage of the demonstration.
- Distribute sample packets of seeds, etc if available with you. This is a goodwill gesture that will be appreciated by all.

Follow-up

- Maintain contact with the farmers through personal contact or through field staff. Help them adopt the technology demonstrated.
- Reinforce learning of the farmers through radio talk, television program, success stories in the press and lectures else where.

Field day at a research farm

As already mentioned, field days can also be arranged at research farms. However, in this case the purpose is different than the field day on a demonstration farm. The research farm organizes a field day to provide neighboring/visiting farmers an opportunity to see all that is being done on the research farm. They may also see new technologies being demonstrated on the research farm. Although these field days also synchronize with crop calendar, there is no demonstrator farmer. The crops are produced by the researchers only. Moreover there may be several crops grown on the farm with several experiments.

Research farms may fix a day in the year when they could invite farmers from far and near. They may even organize a series of field days on different crops. A field day calendar may be prepared in advance and announced in the press. There may be a horticulture field day, a wheat field day, and a cotton field day and so on. The procedure of organizing such field days is more or less the same. The scientists have to make themselves available at every experiment and demonstration to explain the details.

Summary

Field day is the most effective method of convincing farmers of the utility of the new technology. It should become an integral part of the field demonstration plan. In fact no field demonstration is complete without one or two field days. A good field day is a well planned exercise and ensures complete learning of the farmers. A field day on a research farm can become a regular event for the visiting farmers.

Check your progress:

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1. Prepare a list of field days you will organize this year.
2. What major changes will you introduce in the field days that you will organize in future?

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7. Research Goes to Farmers

The utility of research is in its use for the betterment of the farming community. Specially the applied research in agriculture must meet some need and solve some problem faced by the farmers in increasing farm productivity. The whole process of participatory technology development (PTD) indicates that the farmer is the focus of all research efforts. Several new technologies have been developed in your respective countries and else where that could be effectively used by the farmers to improve farm productivity. Some of the areas in which new technologies are awaiting immediate transfer to the farmers are soil management, crop varieties and seed, fertilizer use, water management, weed identification and control, disease identification and control, field and storage pests, post-harvest and grain management.

There is a saying; "The bird of knowledge - one person alone can never catch it". The research in the development of new farming technologies is not solely dependent on scientific input from research stations. Farmers too have to contribute in this process. In some cases they already have a set of their own well tested indigenous technologies that serve them well. Most of the indigenous technologies are culturally transmitted and communicated across generations. Several innovative farmers have also generated new technologies and equipments that have been widely acclaimed and rewarded. Therefore, when we discuss different strategies and programs of transfer of technology, we also include the indigenous technologies developed by the farming communities over a period of time and also some of the innovations developed by farmers.

Transfer of technology

Transfer of technology is an important component of extension and even research. Realizing the importance of taking new technologies to farmers, extension workers and researchers jointly plan strategies of transfer of technologies. The extension methods explained earlier in this manual are used to transfer technologies through various ways and means. However, special programs too have been evolved to take the technologies to the users in different settings with different objectives. These programs and projects have been developed in different parts of the developing countries to meet the local requirements. Fortunately, most of them have wide application in the CAC region as well. Let us know about some of them and adapt and adopt the same in your conditions.

Main characteristic of these programs is that they call for joint, coordinated efforts of both, the researchers and the extension workers. The researchers stand to gain as they get direct feed-back from the farmers about the technologies developed by them. This feed-back helps them in assessment and refinement of the technology under local conditions. In some countries, notably India, these programs are termed as Front-line Extension Programs. These programs are implemented by agricultural universities, research institutes, state departments and experienced voluntary organizations. Some of the noteworthy programs are: National Demonstration Program, Operational Research project, Lab-to-Land Program and The Farm Science Centers (KVKs). Keeping in view the new demands of the agricultural system in India many of these programs have been merged with the Farm Science Centers. Yet, these programs are still relevant and can help the researchers in effective transfer of technology.

National Demonstration Program (NDP)

This program was initiated in India by well known farm scientist Dr. M.S.Swaminathan in 1964. The main objective was to prove to the farmers and the extension agencies that the new high yielding varieties of cereals have much higher yield potential than the varieties available to the farmers at that time. This, he planned to demonstrate through field demonstrations that were organized on farmers' fields. Since such demonstrations were conducted nation-wide, these were termed as National demonstrations (ND). These are field demonstrations conducted by a group of scientists (mostly a soil scientist, an agronomist, a plant protection specialist and an agricultural economist or an agricultural engineer) to replicate higher yields obtained at research stations on farmers' fields. A new set of high yielding variety production technologies is demonstrated on farmers' fields under local conditions. These demonstrations produce scientific evidence of superiority (higher genetic potentiality) of the

new high yielding varieties of cereals have much higher yield potential than the varieties available to the farmers at that time. This, he planned to demonstrate through field demonstrations that were organized on farmers' fields. Since such demonstrations were conducted nation-wide, these were termed as National demonstrations (ND). These are field demonstrations conducted by a group of scientists (mostly a soil scientist, an agronomist, a plant protection specialist and an agricultural economist or an agricultural engineer) to replicate higher yields obtained at research stations on farmers' fields. A new set of high yielding variety production technologies is demonstrated on farmers' fields under local conditions. These demonstrations produce scientific evidence of superiority (higher genetic potentiality) of the new varieties over the local varieties of cereals, pulses and oil seeds. The highlights of the NDP are as follows:

- There is a specific yield target in the demonstrations. No control plot is planned as entire memory of the farmers serves as control. The targets are - to produce 9 tones/ha of grain in a year for a two crop rotation, and 11 tones/ha for a three crop rotation. The demonstrations are conducted both under irrigated and un-irrigated conditions.
- The size of each demonstration plot may vary from one acre to one hectare, depending on availability of land.
- Average holding farmers are selected to conduct ND so that higher yields obtained are not attributed to resourcefulness or richness of the farmer.
- The scientists themselves conduct these demonstrations in collaboration with extension agencies.
- Several NDs can be organized in a country. May be one or two in each district.
- The ND can be used for training farmers and field extension workers in improved cultivation practices.
- Very effective field days can be organized at the demonstration sites.
- The NDs show the yield gaps that exist between the potential yield of new HYVs and the average yields obtained by farmers by cultivating traditional varieties. In wheat this gap is two and a half time and in rice it is three times. These gaps are even wider in un-irrigated conditions.
- The NDs show detailed analysis of the cost of production and profitability of the technology.

The method of conducting NDs is the same as explained earlier in the chapter on demonstrations.

Operational Research Program/Project (ORP)

The experiences generated in the NDP highlighted the importance of demonstrating the application of the technologies on a larger scale and not on one acre or hectare only. *Therefore, the new technologies were put into operation on a larger scale i.e. a watershed, a village or a group of villages.* This gave ample of scope to the scientists to show the worth and impact of the technologies in an integrated manner on a larger scale. There are three types of ORPs:

- **Subject-matter based** - Crop improvement, integrated pest management in cotton, post-harvest technology, land reclamation, etc.
- **Area based** - Arid land management in a district, watershed management, agro-forestry, etc.
- **Client based** - development of small farmers, socio-economic development of poor farmers, tribal development, etc.

The objectives of ORP vary depending on its type, yet there are common ones, such as below:

- To test, adopt and demonstrate the new agricultural technology on farmers' fields in a whole village or in a cluster of few continuous villages/watershed areas.
- To determine profitability of the new technologies and their pace of spread among farmers.
- To identify the constraints like technological, socio-economic, cultural and administrative that are barriers to rapid change.
- To demonstrate group action as a method of popularizing the new technologies at a faster pace.

Steps in setting an ORP

The ORPs are organized primarily by a team of scientists and extension agencies. These help in mutual interaction and ultimately have a multiplier effect. Wait for four to five years for the impact to show. Local peoples' participation is very crucial because they carry forward the work already done in the ORP.

Step 1. Preparation

- Conduct an appraisal in the area of operation to study the problem(s) that need to be solved. This can be done by conducting participatory rural appraisal or a simple survey. Local farmers' help is essential in this work.
- Decide upon the problem(s) that need to be solved in the area. Also consider the resources available at you disposal. These two considerations will help you to decide the type of ORP you need to organize. The three types of ORPs have been explained above.
- Now is the time to gather basic information about the area including agricultural situation. Data on the problem that you have selected would be required at every step.
- Form a team of subject-matter specialists who could contribute their expertise in their respective fields of specializations. Selection of specialists depends upon the requirement of the ORP. However, specialists in agronomy, soils, plant protection, etc are mostly needed. It is always useful to add a social scientist to the team as he can deal with the social aspects of technology dissemination.
- Form interest groups of farmers who will represent the community in all planning and implementation of the ORP. These may be groups of wheat growers, cotton growers, vegetable growers, dairy owners, etc. These groups may be supported by a scientist who can guide the deliberations. Prepare a detailed plan of the ORP. Indicate individual responsibility of all the specialists.
- Select the technologies to be used in the ORP and arrange necessary inputs.
- Select indicators of success of the different dimensions of ORP. These may be number of farmers who have adopted the new technology, impact of the technology on the economic condition of the community, reaction of the farmers on the success of the ORP, willingness of the farmers to continue the work in future, etc.

Step 2. Implementation

- Arrange a group meeting of the interested farmers in the community and present and discuss the detailed plan of ORP. Take their views and incorporate suggestions. Remember, their participation in the ORP is very important.
- Conduct various field activities as per plan. These activities may include field demonstrations, field days, group meetings at suitable occasions, etc. Invite other scientists and extension workers who are not a part of the ORP.
- Let the farmers' interest groups meet regularly and seek their advice and suggestions.
- Make a mid-term appraisal of the plan and make corrections, if required.
- Regularly supervise all the demonstrations and other activities that you have conducted as a part of the ORP.
- Keep detailed data and records of all that is being done and prepare a report at the end. It is important to note that the report may not only contain number of demonstrations conducted, number of farmers contacted, etc, but mainly the impact of the ORP effort on the community. The impact may be in terms of area covered with new technology, increase in productivity as a consequence of the adoption of new technology and change in the attitude and behavior of the farmers. The report is a technical document that will provide evidence of the success or failure of the technologies and methodology used in the ORP. This in fact is the feedback to the researchers and extension workers to either approve the technology for wider adoption or modify the same.

Step 3. Follow-up

- Arrange a general meeting in the community and discuss what has been done in the ORP. Record reactions and suggestions. Enlist support of those farmers who have adopted the new technology or have the potential of adopting the same. Follow up with them and

ensure full and continuous adoption.

- Publish the report in a printed form and widely share with scientists and extension experts. The model developed by you may be used at other locations where similar conditions exist.
- Make the farmers' interest groups permanent features in the community.

Lab-to-Land Program (LLP) - Reach the unreached

This program, as the name suggests, is suggestive of a link between research laboratories and the farmers' fields. This means whatever research has been done in the laboratories should be carried to the farms and the farmers. The "laboratory" also include research farm where most of the farm-research is done.

A special welfare project was launched by the Indian Council of Agricultural Research in 1979 as a part of its Golden Jubilee celebration. The overall objective of the program is to improve the economic condition of the small and marginal farmers and landless agriculture laborers, particularly scheduled castes, backward communities and tribal farmers.

Specific objectives of Lab-to-land program:

- To introduce low-cost relevant agricultural and allied technologies on deprived farmers' farms and homes for increasing employment, and income.
- To assist farmers to develop farm plans keeping in view the availability of technologies, needs and resources (their own and provided externally).
- To guide and help the farmers in the adoption of improved and economically viable technologies on their farms.
- To organize training programs and other extension activities for the farmers.
- To develop functional linkages between the scientists and other institutions for future guidance and help.
- To enable scientists and extension workers use the feed-back given by the farmers.

Steps in initiating Lab-to-land Program

The LLP is organised as a project jointly by the scientists and the extension agencies. There is no separate staff for the project. It can be one of the on-going programs of the agriculture system.

Step 1. Preparation

- Initial steps are similar to those followed in preparing for the ORP. In this program emphasis is on economically deprived farmers only.
- The PRA will indicate the number of economically deprived farmers in a community. At this stage select the families for LLP work. The number depends on resources available.
- Form a team of specialists, extension workers and farmers.
- Collect basic farm and family-based information of the selected families.
- Prepare farm plans of each family. It may contain basic data about farmer's household and details of his farm size, nature of soil, irrigation system, crops grown, etc. The farm plan may include an integrated plan of crop production, animal production and other subsidiary occupation to raise the income of the farm family. Some of the occupations are: goat rearing, rope making, bee keeping, fruit and vegetable growing for additional income, etc.
- Arrange inputs. Make provision of supply of needed inputs out of the program fund. This may continue for a couple of years till the farmers are able to sustain their income.
- Determine the number of field demonstrations, field days and other extension methods that you are planning to use.
- Prepare a detailed plan of work. It will indicate what has to be done, when and by whom. The plan should not be rigid but flexible.

Step 2. Implementation

- Make the program fully participatory. First step in the implementation is to take the farmers with you and develop confidence in them that they themselves can improve their own condition.

- Divide responsibilities among team members. This will facilitate contacts with the farmers.
- Work according to the plan of work. Lay out demonstrations, if any. Conduct interactive method demonstrations and field days to educate the farmers.
- Provide scientific input and technical guidance at suitable occasions.
- Ensure full supply of inputs in time.
- Keep record of every activity. This will help in preparing the final report/document.
- Keep on conducting mid-term appraisal of the program and make suitable corrections. Ensure activities as per the farm plans prepared for each farmer.

Step 3. Follow-up

- This is most important stage in the LLP. The poor farmers covered under this program would need constant support in the process of adoption of new technologies.
- The extension effort has to continue for a longer period of time as it takes time to show impact on poor farmers' community.
- Follow-up with selected technologies that you have found to be more profitable during the course of the program.
- Publicize positive results. Involve the media in publicizing success stories of those farmers who have been able to increase their incomes through the LLP.
- Publish a scientific report explaining what has been done and how it has been done. This will serve as a model for future use.

Tapping indigenous knowledge and farmer's innovations

As pointed out earlier, the indigenous knowledge of the farming community and the farmers' innovations need to be tapped and used as an input in technology development and transfer process. Here are some practical steps for tapping such technologies.

- Researchers should meet the village authorities and seek permission to discuss current local problems and possible solutions. Some of the problems may be related to water management, declining crop productivity, soil salinity, pest and disease infestation etc. Try to reach an agreement on the problems and possible solutions.

- Subsequently, hold discussions with village elders and other knowledgeable persons. Main points of discussion may be nature and importance of problems as perceived by the community. Researchers can offer new technologies at this stage. Some innovative farmers may also show their new ideas or practices developed by them. May be these technologies, if adapted to local conditions, could solve the problem. Involvement of youths at this stage is important.

- Next, the researchers may propose a training workshop on indigenous technologies mainly to analyze local problems and test the new solutions jointly decided by the researchers and the people. It is always better to start from where the people are.

- The researchers may bring new technical material and information to be shared with the people. Depute young farmers to gather information and experiences thus generated during the workshop and report the same to the elders.

- Important elements of the one-week training workshop may be: i) technical content, ii) tools and equipment, iii) local needs assessment, iv) comparison with indigenous knowledge and v) experimental trials and analyses.

The above steps can be used to work with the communities to identify indigenous technologies and amalgamate these with the new technologies. Adaptation of the new combination can best be ensured through training workshops at the village level. Same technologies could be used in other areas having similar conditions.

Farmer-led innovations - the TAAS* recommendations (February, 2005)

In February, 2005, the Trust for Advancement of Agricultural Sciences (TAAS), New Delhi, India, had organized a brainstorming session on farmer-led innovations for increasing productivity, value addition and income generation. Some valuable recommendations emerged from the brainstorming exercise.

1. It is highly essential to document innovations and traditional knowledge and disseminate them further by various organizations. International organizations like FAO, GFAR, APAARI etc could be involved in promoting various successful innovations of the farmers to link them to markets for better income and livelihood opportunities.

2. Involvement of research institutions is quite critical to understand and blend the traditional innovations with scientific refinements for their large scale adoption and popularization.

3. Innovative technologies identified in one region need to be popularized in similar eco-regions elsewhere, through publication, documentation and dissemination of "success stories".

4. Risk management with focus on market opportunities through value addition is required. The farmers are to be protected from varying and often declining prices. Export potentiality has to be explored and procedures streamlined in order to take full advantage of globalization of agriculture.

5. Aggressive programs for training of rural youth, especially farm women for post-harvest handling and value addition of the locally available agri-products well help in linking rural communities to markets for better income opportunities.

6. Setting up of a quality testing laboratory in each region to test and certify farm products (such as organic foods, medicinal plants etc) produced by the local entrepreneurs is an essential requirement for which Government, Private sector and the NGOs support is critical.

7. It is necessary to develop processes of producing drugs from locally available medicinal plants especially to treat local ailments. Patenting and popularizing these value-added products in the local markets will benefit both the producers and the consumers. In this context, the available valuable knowledge relating to medicinal uses of local herbal plants need to be gathered and documented through appropriate incentives and reward mechanisms before same is lost for ever or remains unknown/hidden.

8. Concept of tree plantation as a social activity has to be promoted, especially in dry, desert and hilly areas, which will help in the development of agro-forestry and horticulture in these regions and also ensure better returns for the resource poor communities, beside improvement in our environment.

9. Agro-tourism around farmers' innovative efforts would only generate greater public awareness but would also help in revenue generation and greater community involvement in protecting our rich biodiversity.

10. Creation of a "Farmers Innovation Promotion Board" by the Ministry of Agriculture, (GOI) would obviously accelerate the process of innovations in agriculture to link farmers to markets. Sooner it is done better it will be in the national interest. Example: National Dairy Development Board that has brought about "white revolution" in the country. It has organized small and landless dairy farmers to form rural cooperatives, thus linking them to markets as well as consumers while ensuring regular cash income.

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* Trust for Advancement of Agricultural Sciences (TAAS), Avenue II Indian Agricultural Research Institute, New Delhi 110012. Contact Dr. Raj Paroda for a copy of the Proceedings of the Brainstorming Session.

11. A regular mechanism of scientist-farmer dialogue would certainly accelerate the process of agricultural innovations and hence, be put in place at the national level by the organization such as ICAR.

Check your progress:

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1. What is the main focus in a national demonstration program?
2. Which of the programs discussed above are more suited to the community you are working in?
3. Prepare a short list of indigenous technologies you have come across while working with farmers.

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8. Institute - Village Linkage Program (IVLP): A win-win situation for farmers and scientists

Since the present book is basically for scientists and selected farmers, we may know more about tested research-extension linkage mechanisms that synchronize current research needs with farmers' needs at the field level. This can be done in a manner that both stand to gain in the process of working together. Such a program was evolved in 1995 by the ICAR, India under the leadership of Dr. Raj Paroda, its Ex-Director General. It is termed as "The Institute Village Linkage Program". It provides a mechanism for an interactive participatory approach to research priorities identification. Direct interaction with the farmers allows regular feedback from the farmers to the scientists.

In the past in majority of the cases, the technologies developed were found appropriate only in the area where they were generated. Even slight variations in conditions turned the technology irrelevant. Keeping this in view a new approach is being implemented for technology assessment and refinement through Institute-Village Linkage Program (IVLP). This approach not only helped Indian researchers to prioritize research and develop location-specific technologies. It also ensured full participation of the farmers (users of the technology) in the process (Remember the concept of feed-back?). The IVLP approach is flexible enough to accommodate modifications needed by any system to meet the local requirements.

Research-Extension fraternity

One major change the new technology development system has brought about is the need for a close fraternity between research and extension. Technology development that was considered as the exclusive domain of research has now become a partnership between research and extension systems. It has been realized that a strong symbiotic relationship between the two systems can only ensure development of usable technologies.

This new developing relationship between research and extension has assumed a greater significance with the emergence of new demands on technologies. There is a shift towards those technologies that go well with the whole farming system. Commodity and discipline-oriented technologies have little relevance unless they fit into the farming system, mostly small farming system. In addition, a whole range of agro-ecosystems and varied production systems provide a frame within which the technology development and its transfer could be encouraged. This is what the IVLP aims at achieving.

The ICAR promptly sensed the variability in the agro-ecosystems and subsequent changing needs of the farming communities. It was realized that research and extension systems need to be re-oriented toward the new needs. This realization marked the beginning of the National Agricultural Technology Project (NATP). The IVLP was an integral part of this wider project.

Technology Assessment and Refinement (TAR)

The NATP marked the advent of a new research methodology that promised to bring scientists and farmers together on the same platform. It became more or less mandatory for the scientists to assess the needs of the farmers and develop technologies with full farmers' participation. The application of the newly developed technologies is also assessed under local conditions and necessary refinements made to improve chances of its adoption.

The assessment and refinement are two important steps in technology development process. These two steps take into account variations due to agro-ecological factors. This is the reason TAR is an on-going process and not a linear one. The main objective of using TAR is to engrain this concept and methodology in the research and extension system and the farming communities.

Objectives of TAR:

- To assess the agro-ecological needs of the technologies and the production systems.
- To assess and refine technologies for sustaining enhanced productivity levels, profitability and eco-friendliness in small production systems.

- To make on-farm value addition of agricultural products, by-products and wastes for higher income.
- To address gender specific issues.
- To assess the impact of refined technologies in different production systems.
- To examine possibilities of application of new technologies and tech-modules on a small and large scale and link the same with the extension system.

It is clear that TAR is the methodology of technology assessment and refinement and IVLP is the mechanism of involvement of scientists, SMSs, extension agencies and the farmers in this methodology.

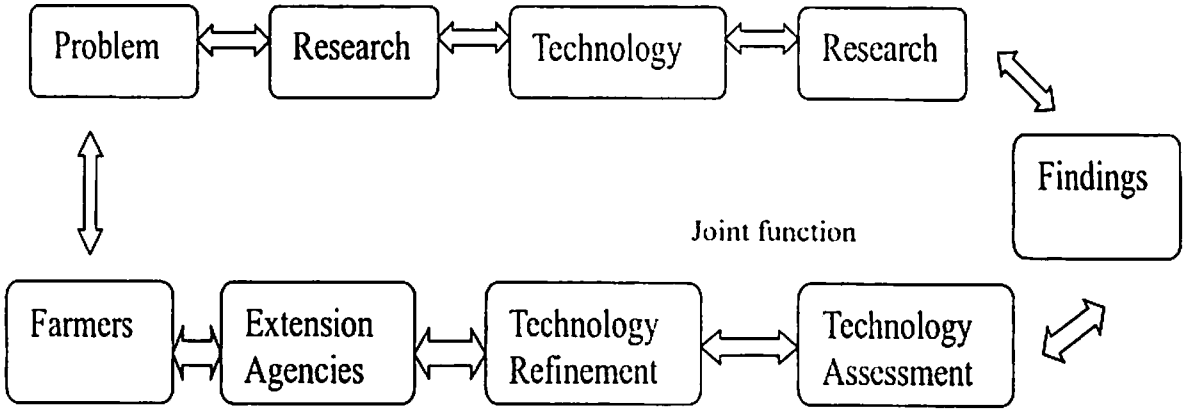

Figure 6. Technology development process: Research-Extension continuum

Production systems

The technology development process as assisted by the extension system is based on different production systems. As already mentioned, development of technology has to match the requirements of the local area. This is called as the 'location-specificity' of the technology. Basically three types of production systems exist in the Asian region.

- Small crop-based production system with low external inputs.
- Well defined farming system with adequate resources.
- Market-oriented commercial farming system.

In a typical farming system there may be various production sub-systems. The technology development system is guided by these sub-systems. Some of the sub-systems are as follows:

- Crops + vegetables
- Crops + vegetables + fruits
- Crops + Animal husbandry & dairying
- Crops + fruit + poultry farming
- Vegetables + Poultry farmin
- Vegetables + animal husbandry and dairying

There may be several such combinations in each of the farming system. One thing to be remembered is that these sub-systems influence technology development (see Figure 6).

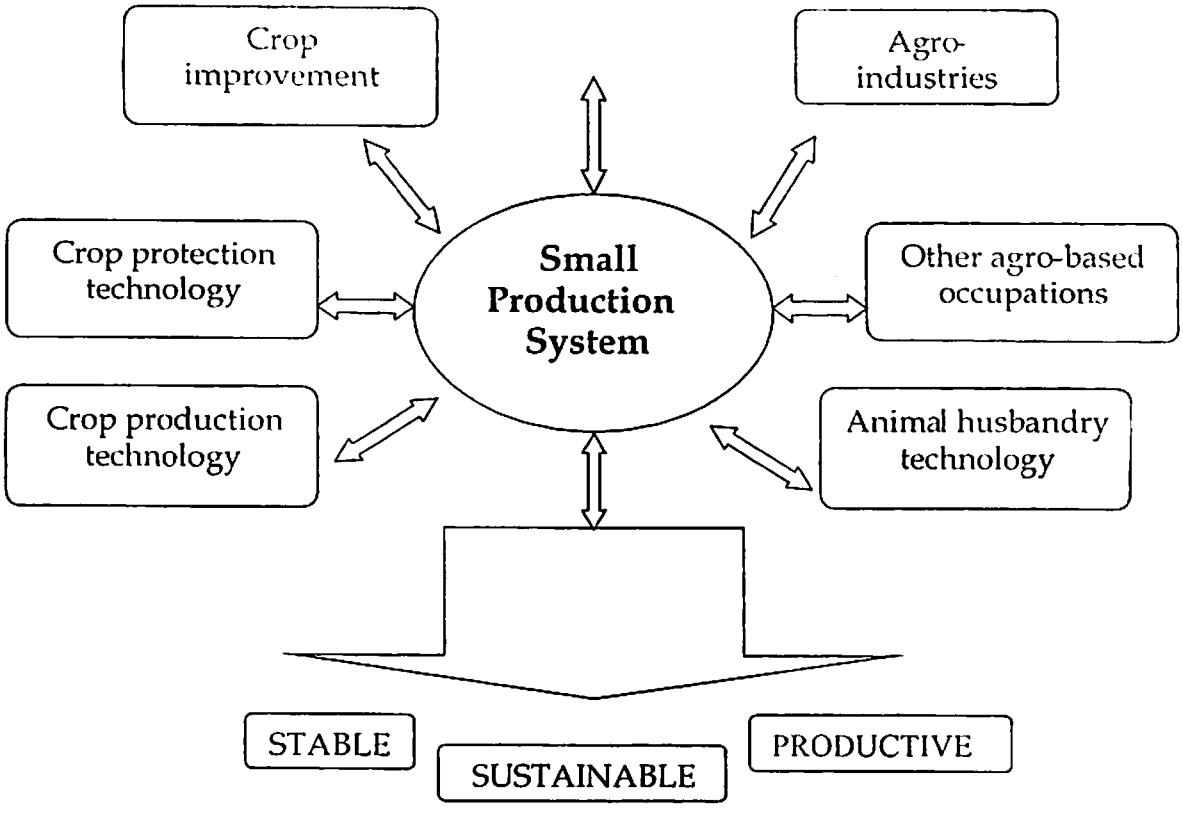

Figure 7. Interrelation of technology development process with different farm production systems

Factors in Technology interventions

Technology interventions are the new technologies that the research and the extension systems want to assess and refine under local conditions. New interventions related to the sub-systems have to be selected depending upon the crops and other enterprises being practiced in the area. Some of the important factors that guide the interventions are as follows:

- Environmental issues
- Marketable surplus
- Post harvest technology for value addition of agri-products, by-products and wastes
- Removal of drudgery in and higher income for women

Steps in IVLP

Step 1. *Select a cluster of villages:* The number of villages should be manageable as the teams involved in the process will have to make frequent trips to the villages. Select the villages that give you enough opportunities to assess the new technological interventions. Other considerations are as follows:

- The villages should be representative of the district (or area).
- Select the villages that are near the research center so that you could make frequently visits.
- Prefer those villages that have adequate local institutional support available like local groups, school, cooperative societies, etc.
- Undeveloped villages are better for the work. Preferably different production systems should be present.

Step 2. *Conduct benchmark survey* of all the three or four agricultural systems that exist in the villages. This will help you in studying the existing situation. You would also know where you started and later-on where did you reach. The survey may collect important agricultural information like land and water

use, farming systems in use including crop and animal production data, status of technology use as related to various crops, extent of use of inputs like seed, fertilizer, pesticide, economics of crop production, indigenous technology being used, enterprises used in the community, institutional support, etc. Bench mark survey may be conducted by collecting information from house holds and secondary data available with agriculture department.

Step 3. *Form team of scientists/subject-matter specialists* to take up responsibility of IVLP. When a strong contingent of SMSs is available, CORE teams and OPTIONAL teams are formed. When only few SMSs are available, one team may be enough. Normally, a team of six is enough. Scientists representing the following disciplines may form the team: *Plant breeding, Agronomy, Soil science, Plant protection, Animal science, Horticulture, Agricultural engineering, Agricultural economics, Agricultural extension and Home science.*

The number of scientists depends upon the requirement of the farming system and the scientific interventions that you need to introduce.

Step 4. *Train the scientists/SMSs* in the process of IVLP. This may include the basic objectives, production systems and their characteristics, bench-mark survey technique, participatory/rapid rural appraisal techniques (PRA and RRA), selection of scientific interventions, techniques of conducting on-farm trials, use of extension methods, specially, group meetings, method demonstrations and composite (also result) demonstrations and monitoring and evaluation techniques.

Step 5. *Conduct agro-eco and feasibility analysis through PRA and RRA.* Although there is a separate section on PRA, it is suffice to name some of the techniques that can be used successfully. These are agro-ecological transect, participatory map making including social map, natural resource map and land use map, time-lines specially natural resource timelines, crop and livestock time-lines, problem tree analysis for cause-effect relationship, matrix analysis, etc. **Prioritize problems** that need to be tackled through new technology.

Step 6. *Prepare technical action plan based on agro-eco analysis.* This may include the following steps:

1. Agro-eco analysis for resource characterization.
2. Tailoring of appropriate technologies as per farming conditions.
3. Collection and assimilation of information on integrated farming for higher income through supplementary enterprises.
4. Testing of research information to tailor technology options.
5. Refining high production, sustainable technology for well-defined production system.
6. Collection and development of data base for application in commercial production system.
7. Technology tailoring for reduction in drudgery and efficiency/income of farm women.
8. Development of information system including market intelligence for agri-business options.
9. Extrapolation based on bio-physical and socio-economic parameters.

Step 7. *Technology tailoring through assessment and refinement* is the most crucial step in the IVLP. The problems identified and prioritized are included for further assessment and refinement of technologies. The criteria of prioritization of problems were as follows.

- Number of families affected (A)
- Area covered by the problem (B)
- Importance of enterprise (C)
- Seriousness of the problem (D)

Some of the problems identified in a Delhi village (Auchandi) by the scientists at the Indian Institute of Agricultural Research, New Delhi (IARI) can be seen in the table on the next page.

Serial No.	Problems identified	(A) (No.)	(B) (Degree 1 to 5)	(C)	(D)	Priority
1.	Low yield of paddy crop	160	4	4	3	III
2.	Low yield of wheat crop	202	4	4	3	I
3.	Low yield of mustard crop	107	2	2	2	V
4.	Low yield of sorghum fodder	150	3	3	2	IV
5.	Low yield of tomato crop	42	3	3	2	VII
6	Low yield of milk from cattle and buffaloes	178	4	4	2	II
7.	High calf mortality	70	2	2	2	VI

Problems identified in Auchandi by IARI scientists

Step 8. *Problem-cause analysis for identification of scientific intervention points* is the next step. As an example, 'Low yield of wheat' has been selected to show how problem-cause diagram can help in identification of 'intervention points'. The problem is analyzed on two parameters viz. a) socio-economic and b) bio-physical. Ultimately the scientists identified four intervention points that would ensure increase in wheat yields in the area. These are:

- Imbalance in the use of nutrients
- Improper variety being grown by the farmers
- More weeds
- Lack of knowledge and skill of improved wheat cultivation practices Similarly, the IARI scientists identified five intervention points to remedy 'low yield of paddy crop'
- Imbalanced use of nutrients
- Poor plant population
- More weeds
- More incidence of insects, pests and diseases
- Lack of knowledge and skills of improved paddy cultivation practices

Step 9. *Selection of technology interventions* is done by the group of scientists through inter-disciplinary discussions based on the technologies available and those needed to be assessed and refined. The technology interventions on the intervention points identified in case of wheat are given below. This is an example only as it is specific to the small production system as it existed in Auchandi village.

Intervention 1. **Selecting suitable salt-tolerant wheat variety for areas having limited irrigation facility and brackish water.**

<u>On-farm research – Varietals selection</u>

- Treatments:
  1. Farmer's practice i.e. own seed of common variety
  2. Certified seed of variety DL-2-153
  3. Certified seed of variety KRL-1-4
  4. Certified seed of variety WH-157
- Plot size — 4000 square meter
- Number of replications — 20
- Critical inputs — Seeds of the three varieties
- Cost of each OFR — US$ 10.00
- Total cost — US$ 10 x 20 = 200.00

S2. Balanced use of fertilizers and their proper placement for optimization of wheat yield under limited irrigation.

On-farm Trial

▪ Treatments:	1. Farmer's practice –NPK 24-12-0 (kg/acre) 2. NPK 48-24-16 3. NPK + Zn - 48-24-16 + 10 ZnSO4 4. NPK + Zn Azatobacter – 48-24-16+10 Zn So4+Azatobacter
▪ Plot size	4000 square meter (4x1000)
▪ Number of replications	80
▪ Critical inputs	DAP, urea, MOP, Zinc sulphate and Azatobacter
▪ Cost of each OFT	US$ 15.00
▪ Total cost	US$ 15 x 80 = 1200.00

S3. Chemical control of weeds (Phalaris minor, wild oats and chenopodium) in wheat crop under limited irrigation

Demonstration

▪ Treatments	1. Farmer's own practice (no chemical use) 2. Use of Isoproturon+2,4-D
▪ Plot size	4000 square meter (2x2000)
▪ Number of demonstrations	80
▪ Critical inputs	1. Isoproturon 2. 2, 4-D
▪ Cost of each demonstration	US$ 5.00
▪ Total cost	US$ 5 x 80 = 400.00

The above examples of the whole process of assessment and refinement are specific to a situation. However, the process is the same and has wide application in other situations. This process can be universally used to assess and refine technologies before these are passed on to the farmers.

Step 10. *Monitoring and Evaluation* has to be continuous process. Local groups of farmers, team members and department of agriculture officials can make separate visits or can move in groups. Each farmer can be given an **IVLP Household Card** so that he maintains a complete record of all that is being done on the farm. Roving consultants can be hired to make on-the-spot evaluation of the achievements of the IVLP.

Agricultural Technology Information Center (ATIC)

Another new technology transfer component being established by the ICAR is the Agricultural Technology Information Center (ATIC). These centers are expected to be a single window support system that will link the research institutions with farmers. The idea is that farmers will have direct access to institute technologies, advice, products, etc. Since these centers will sell HYV seed, publications and other products, they are expected to become financially self-sufficient.

National Agricultural Innovation Project - an Indian experience

Rising population and increasing per capita income in many developing countries are significantly pushing up the food demand. It is imperative that the increasing demands are met through enhanced productivity per unit area, input, time and energy. On the farming front, the productivity of many crops is declining and a vast majority of rural population has very low purchasing power. In spite of promising researches in agriculture, the findings have either not reached farmers or have not been adopted by

them. There seems to be deficiencies in the research and extension systems that such a situation has developed. In India, the agricultural system has responded by initiating a project namely, "National Agricultural Innovation Project" (NAIP). The existing deficiencies in the research and extension systems have been taken care of by redirecting resources to researches that are more need based and innovative. This will improve chances of developing more appropriate technologies that will ensure a better livelihood to the farmers.

Similarly, the development system (Extension) has been made more responsive and imbued with dynamism and capabilities. The project is being jointly funded by the World Bank and The Government of India.

Objectives of NAIP

The NAIP aims at facilitate sustainable transformation of Indian agriculture for rural poverty alleviation and income generation by the application of agricultural innovations through collaboration among farmers, farmers' organizations, public research organizations, the private sector and the civil and other stakeholders.

The specific objectives are as follows (ICAR, New Delhi, 2005):

a) To build the critical capacity of the ICAR as a catalyzing agent for management of change of the Indian National Agricultural Research System (NARS).
b) To promote research in the production-to-consumption system mode in the priority areas / themes to enhance agricultural productivity and profitability and, nutrition, income and employment of the rural stakeholders.
c) To improve livelihood security of the rural people living in selected disadvantaged regions through technology-led innovative systems which encompass the wide process of social and economic change among all the stakeholders.
d) To build capacity to undertake basic and strategic research in strategic areas of agricultural sciences to meet the technology development challenges in the immediate and predictable future. The project has been planned for a period of six years to ensure sufficient time for piloting, learning and then scaling up and uptake of promising technologies and processes wherever possible.

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

The researchers both, from the public and private sector are eligible to participate in the research efforts through competitive grants. A consortium will regulate the functioning of the research aspect of the NAIP.

Summary

The methodology of technology assessment and refinement is a testimony of the fact that research and extension have a close relationship in performing their respective functions. They both need each other and support each other. The experiences generated in India are unique and can influence both research and extension in a big way. The IVLP as explained here may be adopted by the agricultural systems that are still in formative stage. The example of the IARI experiences, hopefully, can be replicated else where with modifications to suit to the local conditions. These examples are only to illustrate the steps involved in the process of assessment and refinement. The new NAIP introduced in India is in fact a system that can be replicated in any developing country with modifications as most of the problems faced by the agricultural development systems and the farming communities are either common or have a common genesis.

Check your progress:

1. Which production systems exist in the community you are working with?
2. Do an exercise on identification of problems and intervention points. This is a group exercise.

9. Participatory Rural Appraisal (PRA)

It is said that agricultural and social research has served the cause of researchers more than that of the farmers. These researches are beyond the appreciation of the ordinary farmers as they could not relate the findings to themselves. They, in fact, suspected that these researches were symbols of dominance of the elite academicians on the rural poor. In early 1960s, many action researches in agriculture revealed that the laboratory -based conventional researches were far from reality and do not match the needs of the farmers. This is because the researches were not tested in the real life situations of the farmers and had no place for the experiences of the farmers who were familiar with the situation and for whom the researches were done. The lab-research ignored the indigenous knowledge that the farmers possessed.

With the change in the democratization movement of the sixties and change in the approach to development, there was a significant shift in the research methodologies as well. It was realized that the people will have to contribute to the development efforts and also play more active role in the affairs of the society.

Latin American scholars and practitioners Paulo Freire and Fals Borda pointed out that:
"...Crucial to the people's taking responsibility of their own development is the conscientization of the people themselves and the problems and structures that rendered them powerless and their collective ability to change that situation..."

How to manage change together as a community to reap benefits for the most disadvantaged groups if not for all members of a community. How to make those who are in power or those who are in a position to allocate resources for the poor to view of this shift as a necessity.

Works of Robert Chambers and Gordon Conway pioneered the technique of Rapid Rural Appraisal (RRA) which was one example of an attempt to include the interest of the poor in the design of programs and the projects. The RRA paid respect to the need to consult the people of their needs. However, it was a superficial tour of the area and could not help in understanding the reality fully. There was less of empowerment of the people in RRA hence; Participatory Rural Appraisal (PRA) was initiated. The PRA is more effective because it is a method that facilitated the community's own in-depth look at themselves and of their possibilities and to articulate these discoveries in their own colorful, meaningful and realistic way.

Principles of PRA

Looking at the contributions made by the PRA and the use of this technique, Robert Chambers would prefer PRA to be remembered as Participation, Reflection and Action. Following are the principles of PRA:

- Development workers are prepared to learn from the people, adapt to the flexible learning process and pace of the community, and to seek out the poorer people and learn their concerns and priorities.
- Main role of the development worker is to facilitate the investigation, analysis, presentation, and learning by the rural people themselves, so that they present and own the outcomes of their activities.
- Developmental workers continuously examine their behaviors so as to recognize errors and to constantly learn to be better facilitators of development with the people.
- Relaxed rapport between outsiders and rural people can and should be established early in the process.
- People have a greater capacity to map, model, quantify, and estimate, rank, score, and diagram their own realities than any outsider and the sharing of these products is popular and powerful because the information is visible, public, checked, and owned by the participants.
- Sequence of PRA exercises build upon the commitment of the participants to further action and self corrective and self learning measures.

The different PRA exercises has the cumulative effect of adding few more dimensions in the community's understanding of itself and all concerned learn through the process of sharing, observing, and analyzing.

Popular PRA techniques

Various PRA techniques are used before awareness rising of the problem, project formulation, implementation, monitoring and evaluation and for specific issues/concerns.Some of the techniques used are: resource and social mapping transect mapping, farm sketching, trend-line, 3-D participatory modeling, service mapping, Venn diagramming, flow charts, historical time line, census mapping, seasonal diagram, demographic profile, wealth ranking, problem tree, etc. Some of the techniques have been described in this book.

Technique 1. Entering the farmers' community

Conducting PRA exercise is not a one-time event. It is the beginning of a lasting relationship between the community and the team. Before conducting PRA the team has to enter the community and establish rapport with the people. This preliminary step is important because it is learning from, with and through members of the local community. The community will tell about the resource use, practices and problems from people's point of view. Stay with people if possible.

Technique 2. On-site analyses

First visit to the community is only for establishing rapport. Subsequent visit is for gathering information. This is followed by on-site analysis. The second round of visit is again for gathering more information followed by on-site analyses. This process is repeated till you are able to focus on the problems and possible solutions. Remember to conduct joint validation of results. This is one method of narrowing the study focus by repeated on-site analyses.

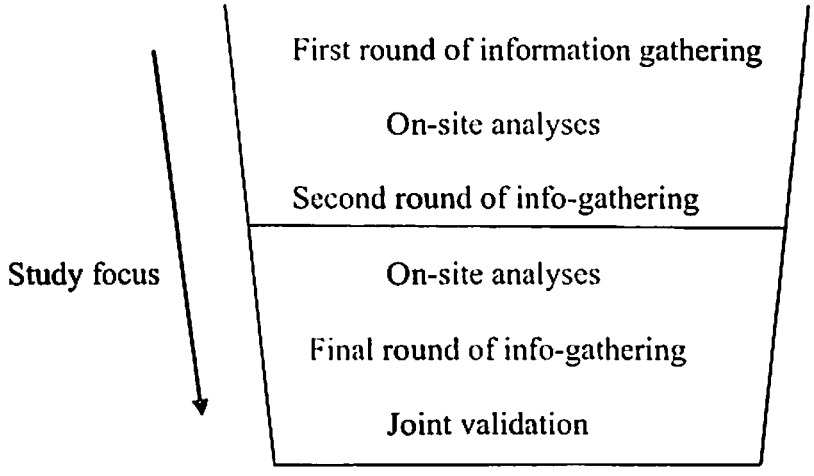

Figure 8. Steps of on -site analyses

Technique 3. Transect walk

This is the basic PRA technique used jointly by the researchers and the extension workers. As the name suggests, it involves walking through the village or community area with the purpose of making direct observations.

- The walk has to be performed with a group of farmers, researchers and extension workers.
- Farmers act as key informants about the natural resources, agricultural situation, location of local institutions, community living, etc.
- The team asks questions while walking across the village, listen to the people, seek problems and asks for possible solutions.
- Findings are mapped in a transect diagram. This could be discussed and further problem identification can be made.

Map-Making in Rural Appraisal

In rural appraisal several techniques are used to study the situation in the villages. Map making is one of the basic techniques used by the extension workers when they want to know the existing locations of different components of a village. A map is a diagrammatic representation of a location and its features. It presents information in a readily understandable form. This is mainly prepared by the village representatives only with the assistance of the extension worker.

Types of maps

- Social map: This map shows households and other social services, roads, sources of water etc.
- Natural resource map: All the natural resources like water bodies, forests, crop areas, hills etc are depicted in this map
- Land use map: This shows land use systems in the village indicating use and ownership of parcels of land and major crops
- Coastal resource map: Map used to depict details of the coastal areas
- Body map: This is mainly used for conducting health related studies in the village wherein the human body is used as the "map".

Purpose of maps

The main purpose of the maps is to identify locations and key features of an area according to the topic under discussion. The key features will vary according to the subject of interest. For example, if the subject of discussion is agriculture, the key features will be irrigation sources, pockets of different crops, seed sale depot. fertilizer depot, etc. Since mapping is a part of quick appraisal, the map gives a quick and simple understanding of the local situation or geographical area. If not done properly, the extension worker will take lot of time to understand the geography of the area as the farmers want him to know.

Mapping once done will provide a sound basis for further work in the area. All the initial information required will be available to the extension worker. With the help of maps it becomes easier to identify problems and issues in an area. The information available in the maps motivates people to discuss the problems and issues and thus assist in decision making..

Materials

Essentially, these are: *pencils, colored pens, paper, chalkboards.* If you are making the map on the ground, use sticks stones or leaves found on the ground to represent key features. Different sizes and colors of leaves or stones can be used to denote differing sizes/importance of features or structures. A copy of the map can be made later for reference if it is made on the ground or in chalk.

Suggested approach

1. Establish rapport with the community first. Be sensitive. Always clarify with them why you are conducting this activity.
2. Gather the participants and explain clearly the purpose of the exercise and the area that will be covered before letting any one to begin. It is useful for all the participants to walk through their community before you begin the map making.
3. Give an orientation on map symbols and conventions in map making. Ask participants what symbols are appropriate for their community and elicit from them any other symbol they use or have used in the past to represent key features in their community.
4. Begin by suggesting key features as the basis for the map to be made, for example, river, main road etc. Encourage the addition of appropriate features.

5. Use probing questions to bring out details or issues relating to the features mapped. This can be the beginning of a discussion and identification of issues and learning points.
6. Ensure participation of everyone, especially if community members are making the map.
7. Make a copy of the map for future reference. Be sure to make an accurate copy of the map and use clear symbols and labels to avoid confusion. Document the process well because oftentimes the original map can get lost or become torn or tattered.

Outcome

The result will be a dramatic representation of a real place with the initial discussion points noted. Participants will gain a preliminary understanding of the surrounding social and geographical area that can be enriched by using other techniques later.

Strengths

- Effective for learning about local perception of the area.
- Can be highly participatory and enables people to learn from others.
- Can be updated or referred to later to indicate progress, learning or change.
- Often brings out important issues that may not have surfaced in a mere discussion.
- Lots of information in an accessible and compact form is available.
- Useful for semi literate or illiterate participants as colors, objects and symbols can be used.

Variations

- Visioning tool (participants can draw a map of how they would like to see their communit resources in the future, e.g., in 20 years time).
- Awareness raising tool (participants can draw a map of their community 20 years ago. This often starts a discussion of how abundant the resources were in the past and what led to their present situation).

This method has been successfully used by many extension workers in many communities.

Timelines as Tools in Development

A timeline is a listing of key events in a community with the corresponding dates. It is most often used as tools in participatory appraisal (where the learning is a multi-way process), and can be modified for use as a visual training technique.

Purpose

A timeline can reveal:

- what a person or a community believes to be important in their history;
- the background to present situations and links between key events, highlighting their importance;
- how people or groups have dealt with issues before;
- changes in attitudes through time;
- changes in use of resources (for example, could the money, medicine, natural resources, depending on the focus of the timeline); and
- development of the community, person or event.

It is important to realize that the written output may not reveal other benefits gained along the process of making the timeline. Documentation of the process could be very helpful in recording more details of the in-depth discussions, which enhance awareness of how the events and the people involved influenced developments in the community.

People

This will depend on the focus of the outline. Often, older people are used as key informants as they know more the history of an event or area. It can be facilitated as a focused discussion by one or two people.

As an option, you may work with the small groups separately at first (for example, representatives of the women's group, farmers, youth, etc.) and consolidate group out- puts afterwards. This can maximize participation as many people are more comfortable working with their friends.

Suggested approach

1. Work through formal and informal leaders in the community to arrange for a meeting with community members.
2. After gathering the people and materials, explain the reason for using the timeline.
3. Ask the participants for a well known event as a reference date and build around it.
4. Allow the people to talk freely and do not worry too much about the accuracy of dates.
5. Use questions to get more details and raise issues. (For example, what important events have happened in the community? What major disasters occurred in the community? When did these happen?)
6. Make copies for future reference.
7. Validate the timeline by asking other community members.

Outcome

The outcome will be a list of dates and events.

Strengths

Timelines are useful tools to complement case studies and action research. They provide lots of historical information in a simple and easily understandable form. They show the importance of the past to present. Experience shows that the communities are happy to have a written record of the development of their community and enjoy completing this exercise. This also boosts respect for older people. Work with the local officials and respected persons in the community to get the trust and cooperation of other community members. Be careful in raising expectations as some communities may have experiences with other agencies/organizations which promise much but failed to deliver.

Limitations

- Timelines can stretch with many names and dates that do not enhance understanding, so be careful to include only useful information
- Limited availability of older people.

Variations in Timeline

Timelines are of many types depending upon the subjects they cover. There are historical timelines, agricultural timelines, natural resource timelines and composite timelines. An example of the historical timeline is given in this section.

- Get people to write down events that they think are important on separate pieces of paper, and then stick them onto the board in a particular order. If some events are repeated, this reflects a high level of importance to many people.
- Each person could have one piece of paper or card with one event on it, and then the participants all form a line holding the events in order.
- A base line with regular divisions can be used as a starter, and then events can be added to it. Uneven spacing of events can provoke discussion as to "why" this has happened.

Year	Description
1859	This village was established and its name was Suratgarh
1867	Muslims from Montgomery (then Punjab) came and settled here
1867	The village was renamed as Punjab Khor
1940	Traditional farming being practiced
1940	First primary school as started
1947	During the partition of India – Pakistan, Muslims left this village for Pakistan and the village was deserted.
1947	People from surrounding areas as well as refugees from Pakistan were rehabilitated here. Farming was their main profession
1949	First Gurudwara (sikh shrine)was built
1952	Land consolidation was done
1955	First woman gets a job
1955	Junior middle school was started
1956	Concrete road was constructed
1960	Bus service was introduced
1965	Electrification of the village was done
1965	High yielding varieties were introduced
1978	First television set was bought by a local man
1979	First telephone line was laid in the village
1980	Facility of drinking water was developed
1995	IVLP work initiated in the village

Figure 9. Historical Time-line in a Delhi village (IVLP VILLAGE)

Participatory Learning and Action

Participatory Learning and Action (PLA) is an umbrella term for a wide range of similar approaches and methodologies, including Participatory Rural Appraisal (PRA), Rapid Rural Appraisal (RRA), Participatory Learning Methods (PALM), Participatory Action Research (PAR), Farming Systems Research (FSR), and many others. The common theme to all these approaches is the full participation of people in the processes of learning about their needs and opportunities, and in the action required to address them.

Common principles of PLA:

- A defined methodology and systematic learning process: the focus should be on community learning through a system of joint analysis and interaction.
- Multiple perspectives: it is important to reflect the various interpretations of reality and solutions for problems by the different stakeholders (seeking diversity and differences).
- Group learning process: revealing this complexity of the problems can only be done through group analysis and interaction.
- Context specific: methods and approaches should as much as possible be designed or adapted to the local situation, preferably by the actors involved (ownership).
- Facilitating experts and stakeholders: the role of outsiders (researchers and/or practitioners who are not members of the community or group with whom they interact) is to act as catalysts (facilitators) for local people to decide what to do with the information and analysis they generate. Outsiders may also choose to further analyze the findings generated by PLA, to influence policy-making processes.

PLA - what have we learned

- Outsiders do not have all the answers.
- Local people have a rich knowledge base and experience of making a living in a complex environment (e.g. 10 different crops and 4 species of livestock all being farmed on 2 acres of land supporting a family of 6).
- People realized that local communities are much more likely to come up with appropriate solutions to problems than outsiders.

- Within PLA the role of outsiders is more of facilitating a process, where by local people identify, prioritize and analyze their own problems, and develop their own solutions.

Outsiders can also play a useful role in facilitating links between communities and other organizations with technical expertise or funding. Outsiders can also offer their own skills and expertise but should not impose these on local people.

Problem Tree Analysis for identifying development-projects

1. Identify major problem or cluster of related problems and select one as the central problem.
2. Examine cause-effects relationships and organize these in the form of a problem tree.
3. Identify stakeholders and relate each to the causes and effects.
4. Construct an objective tree based on the problem tree.
5. List and review options for development action or intervention involving different stakeholders.
6. Select strategies deemed most feasible and appropriate to the local context.

Check your progress:

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1. Is it possible for you to conduct a PRA in your area? What are the problems you are likely to face and how will you solve them? This is a group exercise.
2. Conduct a transect walk and prepare a resource map. This is a group exercise.

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10. Audio- Visual Aids as Instructional Materials

This is the age of fast and sophisticated communication tools. Computer has changed the way the world communicates. The internet system, the power point and other tools provide a wide range of opportunities in communication. However, it is some times assumed that more expensive or "high technology" communication aids are better than simple aids. This may not be always true. In extension work researchers and extension workers need simple, readily available communication tools.

A set of simple non-projected and projected aids are still available for extension situations that can be used with great ease and effect. Here is a set of simple audio-visual aids that are available in the village situation at low cost. Each aid can be useful for a given situation, and oftentimes the simple, inexpensive audio-visual aids may be the most appropriate. Nevertheless, all audio-visual aids have advantages and disadvantages, and all can be useful as long as the user makes the best match between the aid, the objectives, the audience and the situation.

Cone of experience

We all learn through experiences. Fire burns and ice is cold were learnt by experiencing them only. These were direct experience. However, we learn through indirect experiences as well. For example, by seeing a drama, a demonstration, a television programme, a film, reading a book or listening to a speech. Thus we learn through a range of direct, contrived (indirect) and symbolic experiences. These experiences have been arranged by Jerome Bruner in a cone form. This form has been used because the experiences at the bottom of the cone are the fundamental experiences, and other types of experiences are based on them. It is not that symbolic experiences are undesirable, but in order to have symbolic experiences, one has to go through contrived or direct experiences. Thus, the experiences at the bottom of the cone are the fundamental experiences. That is why the experiences have been arranged in a cone form.

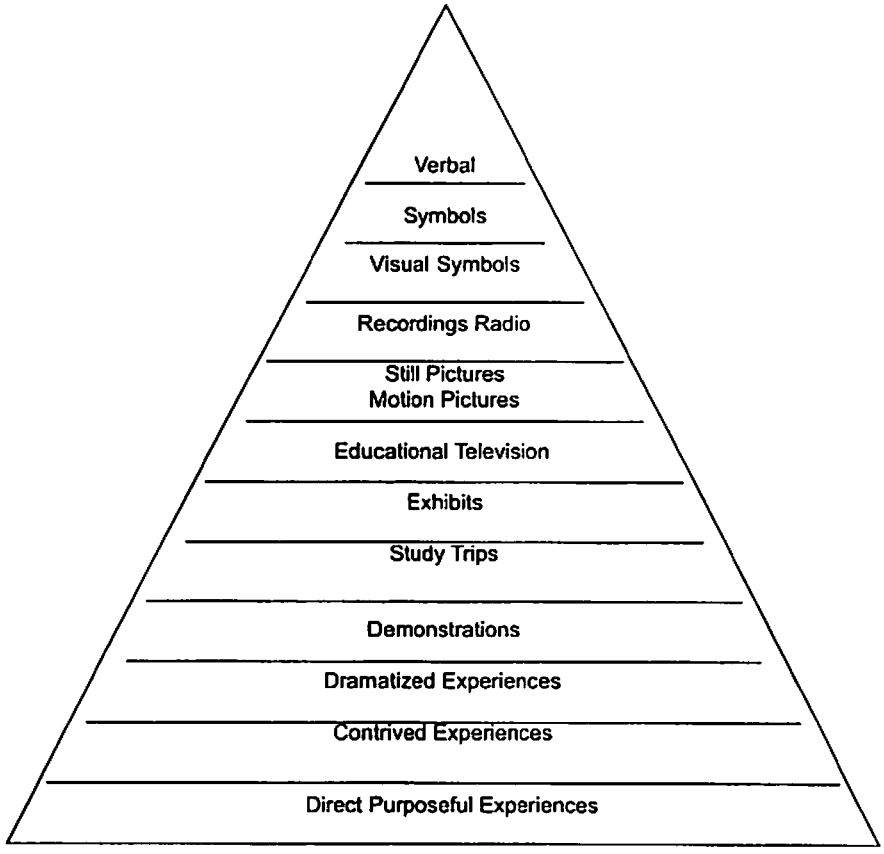

Figure 10. Cone of experience: Moving from the simple to the complex, the continuum describes the range of audio-visual materials available for use in extension work.

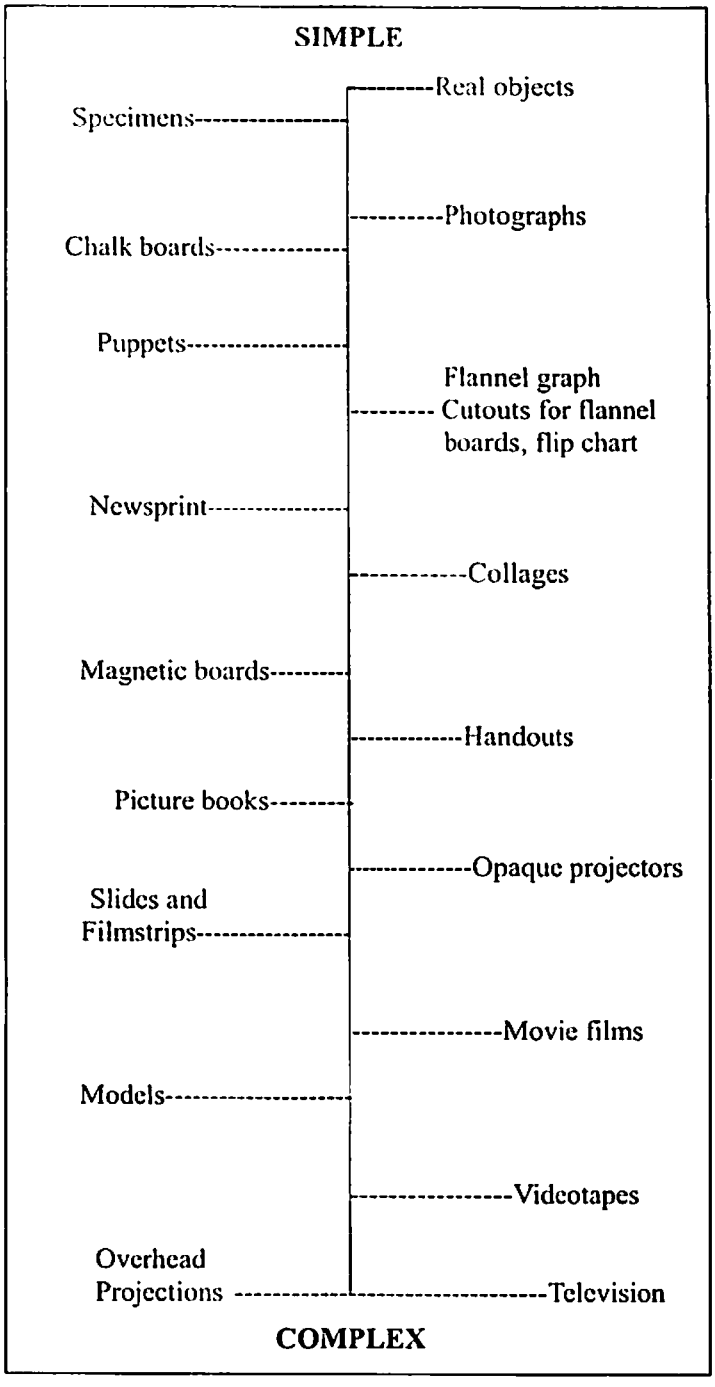

Figure 11. A.V. Aids from simple to complex

The following list describes some advantages and disadvantages of various AV aids. This will help in selecting most appropriate AV aids in a particular training situation. Here only some of the important AV aids have been selected for description.

Posters and Charts

These two are most important and often used paper aids. A poster is a sheet of paper of a reasonable size (30"x40" or 20"x30" or any similar size) having a written slogan of few words and a bold picture or illustration. It depicts only one idea. It is usually placed on a wall or a board where people can see it on their own. It is not explained by any one as it is self-explanatory. Example: *"Grow HYV of Wheat". "Control cotton boll worm with...."*

A chart, on contrary, has many ideas on a sheet of paper. It shows details of a process, comparisons between or among different components/steps of a process, a process or a table /graph/bar diagrams etc. Example: *"How to grow a paddy nursery", "How to conserve water in dry lands"*.

Handouts

Handouts are simple sheets of paper(s) in a book size or bigger than this. It contains most of the content covered in the training/meeting sessions. It may be in the form of a single sheet or a folder form as well. It is written in a simple language for the benefit of the farmers.

Advantages

- Can be distributed to each participant.
- Can be kept by participants for future reference.
- Can be used in large as well as small groups.

Disadvantages

- Must be reproduced before training session or meeting.
- Need special reproduction equipment.
- Depending on the size of group and number of handouts, may be expensive and inconvenient to transport.

Suggestions

- Distribute handouts either before or at the close of a session. This will keep attention on leader/extension worker during session.
- If handout has to be used as a summary for material presented verbally, inform farmers at the beginning of the session. They will then focus attention on the extension worker and not take unnecessary notes.

Chalkboard

Chalkboard is the most popular aid in teaching and training. It has a wooden or a ground glass surface. It may be black or green or blue in color.

Advantages

- Generally available and not expensive.
- Does not normally need to be transported.
- Requires no advance preparation of visuals.
- Especially useful when session content focuses on calculations, where much erasing occurs.

Disadvantages

- Requires speaker to turn away from participants while writing.
- Speaker may have tendency to talk to the board.
- Can not be seen well in large groups.
- Dramatic, unusual effects are not possible.
- Chalkboards remind people of pedagogical (teaching children) teaching methods

Suggestions

- Use chalkboard to write a few key words and then face the audience to discuss them.
- Use large letters.
- Do not overcrowd the board and erase irrelevant material.
- Use colored chalk for emphasis.

Flipchart pad

This pad consists of a bunch of white sheets of paper or newsprint, reasonably thick (not chart paper) tagged at the top to hold the sheets together. The speaker uses one sheet at a time for writing while the session is on. He may use chiseled marking pens for this purpose.

Advantages

- Can focus attention on one concept at a time
- Can be used in same fashion as the chalkboard and material can be prepared in advance
- Can be used to present consecutive points which are then displayed together on a wall; for example to show relationships and remind participants what has been covered.
- Can highlight points by using different colored markers.
- Material can be saved for reuse in other sessions or for review.
- Single sheets are easily transported.
- Plastic flipcharts can be erased and reused.
- Newsprint is often available for free or at half a nominal cost.

Disadvantages

- Flipchart paper and newsprint have limited space to write on.
- Markers and tapes are needed.
- Can not be seen well in large groups.
- Flipchart pads and easels are expensive and may not be readily available.

Suggestions

- Condense information before putting on a chart.
- Do not use more than 4-5 words per line and 6-8 lines per sheet.
- Use large sheets and different colors.
- Conceal each chart with a blank page until ready to use it.
- Reveal points one at a time by folding or taping bottom of page under the point being discussed (strip tease).
- Stand to the side of the chart when turning sheets or showing a point.
- Always arrange sheets in order of their appearance.
- Tape and label corners of individual sheets so they can be easily found when needed.
- After the information on the sheet has been discussed, post the sheet on the wall.
- Keep extra markers available.
- Use a pencil to write yourself notes on the sheets - notations will be invisible to the participants.
- During group discussion, use blank sheets of flipchart paper to record responses from the participants

Flannel board

It is a flat wooden/plywood board with flannel cloth covering it. This board is placed on a stand and placed in the room where all can see it. The speaker develops a story or a series of ideas to be presented in the session and prepares a series of cut pictures or illustrations. These illustrations have sand paper pasted at the back of each piece so that it sticks on the flannel board. The trainer goes on placing the pictures or illustrations on the board and simultaneously talks to the group. The picture which has been used is removed and a new picture is placed on the board. Thus, a series of ideas or a story can be depicted to the audience.

Advantages

- The speaker can built a story or a situation from which problems or concepts may be identified and discussed.
- Encourages open ended, problem posing discussions.

- Can illustrate real life situations.
- Can be easily transported and used almost anywhere.
- Can use a variety of visuals: words and phrases, mathematical/chemical symbols, photographs or cut outs of physical objects.
- Can be used with semi and non-literate audiences.
- Low initial and recurrent costs.
- It is reusable.

Disadvantages

- Requires skilled group facilitator to guide group discussion.
- Visuals must be prepared ahead of time.
- Can not be written on like other boards.
- Flannel may not be readily accessible.
- Need a variety of pieces for different topics and audiences.
- Flannel figures must be pilot tested with a representative sample of the target group. This is done to determine whether the audience can accurately interpret the meaning of visuals.

Suggestions

- Arrange cut outs in order before session.
- Brush flannel before using to ensure pieces will stick together.
- Encourage participants to describe the situation relating to the topic using the board and figures.

Photographs, posters and collages

Photographs are very useful material for putting across new ideas in the training sessions. Colored action photographs are better communicators. Posters are communication medium which convey one idea at a time. They are prepared on large sheets of paper with bold illustrations and small or no written material. It is said posters stand on their own legs and need not be explained to the audience. Collage is a mixed picture of several photographs or illustrations cut and pasted in an irregular fashion on a sheet of paper. Yet it conveys a meaning as the photos and the illustrations are related to the main theme of the presentation.

Advantages

- Can act as a catalyst for open-ended discussions.
- Can address one concept or problem at a time.
- Collages can be made by participants to illustrate individual or characteristics and/or situations.
- Good for semi- and non-literate audiences.
- Easily transported.
- Photographs and posters are re-usable.

Disadvantages

- Requires a skilled facilitator for group discussions.
- Needs to be pilot tested to determine audience's interpretation of visuals.
- Audience may see something different than what is intended.
- Picture or poster may show a situation that is uncomfortable for participants to discuss.
- Photographs may be too small to use in large groups.
- Need artistic talent to produce.
- Posters can be expensive, especially if professionally produced.

Suggestions

- When using pictures, posters or collages the following questions are useful:

-What do you see happening here? (What is the meaning of this picture?)
-Why does it happen?
-Does this happen in your situation?
-If it does, what problems does it cause?
-What can be done about it?

Specimen

These are the real objects used as visual aids. For example, seed samples, plants, flowers etc.

Advantages

- Can generate open-ended discussions.
- Can develop observation and analysis skills.
- Can show a real representation of a problem.
- Usually can be obtained easily, especially well for remote areas.
- Can be used with non literate audience.

Disadvantages

- Some specimen may be difficult to locate.
- Some may be expensive to prepare.
- Some may require special equipment.
- Some may be too small to use in large groups.

Suggestions

- Use the objects found as specimen in training:
  - diseased plant or animal
  - damaged piece of machinery
  - poorly prepared flipchart etc

Models

These are the replica of the real objects used as visuals in training. For example, model of a tractor, a breed of sheep, a plough, a body part etc.

Advantages

- Can be as simple as a graphic illustration of a concept, or as complex as a small-scale version of a real object.
- Can show a phenomenon at work in a group or in an environment.
- Can indicate a sequence of events of events or actions.
- Can clarify abstract concepts.

Disadvantages

- Scale models are often expensive and may be difficult to transport.
- Models with working parts may break down and require replacement.

Suggestions

- People can also be used as models - use a child to demonstrate how to measure upper arm circumference for malnutrition

This list of audio-visual aids depicts only the important ones that can be successfully used in rural areas. However, it is not our intension to undermine the use of computers and other sophisticated gadgets. The researchers and the extension workers have to be computer literate in order to have access to the large store of knowledge available else where. The use of simple aids is recommended especially because of distinct advantage of simplicity and cost.

Projected Aids as Instructional Materials

There has been a revolution in the use of projected aids in the recent times. Those aids that we frequently used are out of use at present. For example, filmstrips are not in use any more. Slides are still in use because of several advantages. Those having adequate equipment support prepare power point presentations. Here are some of the projected aids that can be used by the extension workers.

Slides

These are projected aids extensively used in extension work and training programs. Now, with the introduction of sophisticated computer technology, their use has reduced. Nevertheless, they are still potent media of communication.

Advantages

- Provide color and real-life images for participants.
- Can show sequence of events or demonstrate cause and effect relationship.
- Can illustrate step by step procedures for carrying out a task.
- Can be used with large or small groups.
- Allow trainer/extension worker to interact with participants while AV aids is being used.
- Slide can be mixed and matched to design presentations for different audiences and session content.
- Easy to use and fairly portable.

Disadvantages

- Requires electricity.
- Initial and current cost can be high... slides and filmstrips must be developed;
- Projectors must be maintained.
- Spare parts may be difficult to obtain.
- Can be unreliable ....if projector malfunctions, session may suffer.
- Requires a darkened room for projection.
- May not be effective for audiences that have no exposure to projected AV aids.
- Participants may have difficulty taking notes in a darkroom.
- Filmstrips are inflexible; they can be altered for different sessions.

Suggestions

- Use slides or film strips as you would use a poster - introduce a concept or a problem with the AV aids and allow a group discussion to emerge from the AV presentation

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Opaque projector

It is equipment which is used to project opaque objects like pages from a book, illustrations, pictures or even a specimen of a diseased leaf.

Advantage

- Can project pictures, graphs, charts or written material directly from a book.
- Can be used in large or small groups.
- Can be used in place of handouts.
- Less expensive than preparing handouts, slides or overhead transparencies.

Disadvantages

- Requires electricity.
- Heavy and bulky, difficult to transport.

- Requires darkened room for projection.
- Initial expense is high.
- Spare parts may be difficult to obtain.
- If projector malfunctions, session may suffer.
- Participants may have difficulty taking notes in darkened rooms.
- May not be effective for audiences that have no exposure to projected aids.

Suggestions

- When using opaque projector, trainer should have a copy of the material being projected so he/she can maintain contact with participants.

Overhead projector (OHP)

It is an equipment to project written materials prepared on a transparent plastic sheet. The sheet may be a single sheet or in a roll form. Special OHP pen are used for writing on the plastic sheets that are transparent. Light passing through the sheets is reflected on the screen.

Advantages

- Trainer can maintain eye contact with participants while using the AV aids.
- Can use prepared transparencies or develop them during the session.
- Projector is very easy to use.
- Sequential procedures or cause effect-relationships ca be illustrated by using overlay transparencies.
- Any transparent material can be used if overhead transparencies are not available.
- Portable, same size as a small suitcase.
- Can be used in large or small groups.
- Does not require darkened room.
- Transparencies are reusable.

Disadvantages

- Requires electricity.
- Moderate initial expense.
- Separate parts may be difficult to obtain.
- Projector may mal function.
- May not be appropriate for audience with low level of visual literacy.

Suggestions

- Turn projector off when changing transparencies
- Use water soluble pens so transparency sheets can be erased and re used
- Use different colors to emphasize key points
- When several points are listed on a transparency, cover those not being addressed until you are ready to discuss them (strip tease)
- Print or draw clearly and large enough for audience to see

Movie films and broadcast television

Advantages

- Can demonstrate action and show real life drama.
- Allows participants to observe real situations in a non-threatening way.
- Can be used to build awareness and form attitudes on a particular subject.
- Can assist in developing problem-solving and critical thinking skills.
- Can provide clarity for skill building exercises and can demonstrate proper procedures.

Disadvantages

- Require electricity.
- Broadcast television requires that training / extension session be designed around schedule of television station.
- Equipment is expensive and requires periodic maintenance.
- Spare parts may be difficult to obtain.
- Films must be bought or produced or purchased. Films may not be appropriate for audience.
- Film production is very expensive.
- For audiences that have little or no exposure to motion pictures, the AV aid may be so distracting that the message is lost.
- Operation of film projector requires some training.
- Equipment is bulky and heavy, not easily transported.
- Room needs to be darkened for viewing.

Suggestions

- Prepare discussion questions and distribute to participants for movie or TV program.

Video cameras and record players

Advantages

- Videotaping and playback during a training session can provide immediate feedback to participants on their skills and behavior.
- Videotape can be stopped while discussing a point.
- Reusable tapes can be saved and replayed or erased and used again.
- Tapes can be produced specifically for one audience or training session.
- Tapes can be edited to remove unwanted material.
- Less expensive and more flexible than films or television.
- Portability...compact cameras can be taken any where.
- Can use batteries or electrical outlets.
- Videotapes can be reproduced and distributed.
- Training programs can be video taped and sent to other locations.
- The most versatile of all projected aids.

Disadvantages

- Expensive several pieces of equipment are required.
- Require periodic maintenance.
- Spare parts may be difficult to obtain.
- Operation of equipment requires some training.
- Video may be ineffective if filmed by an inexperienced camera operator.
- Playback machines are bulky, heavy and not easily transported.
- Audience not accustomed to being videotaped may be uncomfortable watching themselves when the tape is replayed.

Check your progress:

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1. List some of the audio-visual aids that you have found effective in your work.
2. Prepare a chart on Control of cotton pests.
3. Which projected aid you had known before and which are the new ones for you?
4. Prepare a few transparencies for the OHP.

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11. Delivering Lecture

Do you remember an occasion when you delivered an effective talk? Have you ever heard a badly delivered talk by a speaker? Why the talks are good or bad? Who, you think is a good speaker? Can you learn to deliver an effective talk? Whether you are a researcher or an extension worker, there are some basic skills that you can practice. Lectures are otherwise passive in nature and provide un-stimulating experiences unless the speaker is a talented communicator. Therefore, a smaller version of a lecture is more preferred over a long lecture. This is called a Lecture. Why a Lecture and why not a lecture? These are some questions, which would lead to our discussion on using this strong medium of communication.

What is a lecture?

It is a short talk designed to prevent boredom from setting in; in experiential learning speakers or trainers/facilitators typically give short inputs rather than full lectures. The duration of a lecture may be 15 to 20 minutes. This duration suits the attention span of adult farmers.

Why lecture?

"The mind can absorb only as much as the seat can endure". Normally adults cannot listen to long lectures, which tend to be boring and dull. Learners become passive listeners and lack motivation. Since lecture is mostly one-way, learners cannot seek clarifications. The listening rates in a group of adults vary. Those with lower listening rates, miss the content of the lecture. Even adults are not able to retain their learning for a long time.

When to use lecture?

Lecture is most convenient and cost-effective method to disseminate new materials and ideas to a group. It reduces boredom in non-lecture type programs where it adds to the variety. Questions can be asked and comments given within the method.

A lecture is useful in the following situations:

- Lecture is the most convenient and cost-effective method to disseminate materials to the participants.
- Individual participant's reactions and quarries can easily be addressed to through a lecture.
- A non-lecture type program becomes lively with occasional lecture. It reduces boredom.
- When the speaker / trainer is talking about equipment, a lecture enables the use of demonstration technique or a process.

Stages of doing a lecture

Getting ready

- Prepare yourself to help the participants
- Prepare yourself to be spontaneous
- Sense the mood of the audience
- Involve the participants at the outset. Give them a pre-work reading assignment or a case or problem analysis. Start the lecture after this assignment

Starting

- It is a warm-up time for the trainer.
- Tell what you are going to do during the lecture
- Prepare the participants by asking questions like: "Why should you be interested in the lecture?"
- Tell them how do you want them to listen and respond to the lecture

Present the major points

- Rehearse and put on the flip chart
- Use concrete examples
- Use simple visuals
- Be enthusiastic and use humor
- Keep eye contact

Closing

Summarize. Also tell them that you have told them what you had to tell. Encourage participants to apply the message to their situations.

How to deal with questions?

Main purpose of the question-answer session is to check understanding and retention and to correct any misperceptions. It is also to find out knowledge gaps and barriers to learning. Therefore, questions are important part of a lecture. Participants should be free to ask questions during the session or at the end.

Many participants hesitate to ask questions in a group. Many cultures stifle natural tendencies towards curiosity. That is why many participants avoid asking questions, as it may be impolite to ask a question to a stranger or a very senior person. Other reasons for not asking questions may be," it will show my ignorance", "I do not want to bother busy people by asking questions".

Even some extension workers/trainers may have a dislike if participants ask questions! These may expose their ignorance or may create a fear of discussing a painful subject. Some extension workers/trainers may even show reluctance to share information with the participants. Here are some guidelines to handle questions during the training sessions:

- Provide time for questioning at the end.
- Respond to questions by name. Do not say, "Some body asked that....."
- Toss back questions occasionally to the group. Treat irrelevant questions gracefully.
- Avoid monopoly of one person to ask questions.
- If you cannot answer the question, admit it. You may find out the answer and reply later.
- Do not give sarcastic responses to the question.
- Rephrase questions if needed.

What is a good question?

To ask a question is also an art. Question is not a lecture in itself. A good question should have the following qualities:

- Clarity
- Brevity
- Pertinence
- Challenge

Tips to polish your lecture:

- Know your subject well and earn right to speak
- Prepare your lecture well and practice with action
- Over preparation is helpful
- State your objectives immediately
- Use effective visual aids
- Use voice variation, gestures and movements.
- Avoid extra gestures and movements
- Give pauses in speech and vary the tempo

- Abandon podium
- Maintain eye contact
- Use humor, anecdotes and examples
- Do not read from manuscript, use general notes
- Exude sincerity and conviction
- Watch your beginnings - attract the attention of the participants early
- Try to get feed back about your performance
- Avoid "uhs" and "ahs" in your speech
- Know your audience
- Dress properly
- Personalize talk
- Use "you" in your speech
- Avoid heavy statistics
- Use every day language
- Quit in time

The different types of audiences have been explained in the chapter on group discussion. That knowledge will be helpful here as well.

Check your progress:

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1. Group exercise on 'What is the difference between a Lecture and a speech".

2. You have been asked to give a talk to a group of farmers not known to you. How do you prepare for such a talk? You may first select a topic where you have a different opinion from the group and another topic where you are in full agreement with the group.

3. As an exercise, the participants in a training session may prepare a talk to be delivered to a group of farmers known to them and another one for a group of farmers not known to them. Emphasize on the beginning and the end of the talk.

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12. Group Meetings

In extension work we have to often arrange group meetings for giving common information or decision making or viewing a method demonstration. Such meetings need to be arranged in a planned manner to achieve desired results. Call a group meeting if it is required.

Group meeting is a method of democratically arriving at certain decisions by a group, by taking into consideration the members' point of view. The group may consist of 15 to 20 members only. This is a manageable size. However, in real situation you may confront even bigger groups.

Talking to farmers individually and in groups are two different situations. A farmer may behave differently in these two situations. Groups have a different setting in which participants influence each other. Discussions in such a setting allow free communication among the extension worker, the subject matter specialists and the farmers. Collective decision making is a plus point in this method.

Thus, the objectives of this extension method may be explained as follows:

- To prepare a favorable climate for discussion and help in better understanding of the problems by pooling the knowledge and experience of a number of persons.
- To facilitate in-depth discussion by involving a small number of participants.
- To generate new ideas and methods and select more rational ones.
- To develop a favorable attitude and commitment for action through group involvement.
- To act as a safety valve for reducing tension.

Plan and prepare

- Decide on the topic to be discussed.
- Prepare an agenda that is agreeable to all concerned.
- Invite participants who could contribute to decision making.
- Contact subject matter specialists and ensure their presence in the meeting. Collect relevant information.

Conduct meeting

- Start the meeting in time.
- Introduce the topic and initiate discussion.
- Facilitate free discussion and encourage every member to participate. Extension worker need not dominate the discussion.
- Record the proceedings.

Follow-up

- Repeat the decisions taken and encourage members to take action accordingly. Arrange inputs, credit and other facilities for the farmers who want to take action.
- Maintain personal contact so that the farmers remain interested in the extension work.

Small Group Methods

Small groups are the basis of experiential learning. You would recollect group meetings are basically meant for making decisions on common issues relating to the farming community. How to conduct the group and how to make better decisions that have more chances of acceptance? There are some techniques that you could use with great effect.

Oliver Wendell Holmes Jr. once said, *"Many new ideas grow better when transplanted into another mind than in the one where they sprang up"*. In participatory extension methods small groups have been used to enhance participants' learning and ensure better decisions. There are a number of specific small group techniques that are available to the extension workers. These techniques are basic and easy to use.

The Dyads

Pairs as they are popularly called can be readily used to involve the total group with quickness and efficiency. The extension worker needs to tell the group, "Turn to the person on your left (or right or behind) and discuss for five minutes the implications of the subject." The group is quickly filled with enthusiasm and action. The advantage is that **two persons interact in a no-threat situation** where quick rapport is established. Dyads encourage thought and discussion, provide feedback, and resolve conflict in group and share information.

Dyads can meet in a group situation, on lunch or during a walk. Dyads can be used to establish "horizontal peer network". **The dyads provide an opportunity to build a deeper relationship with one or more members of the group,** some thing that the formal group meetings do not provide. Some times the dyads do not work effectively because of poor chemistry between the two people.

The Triads

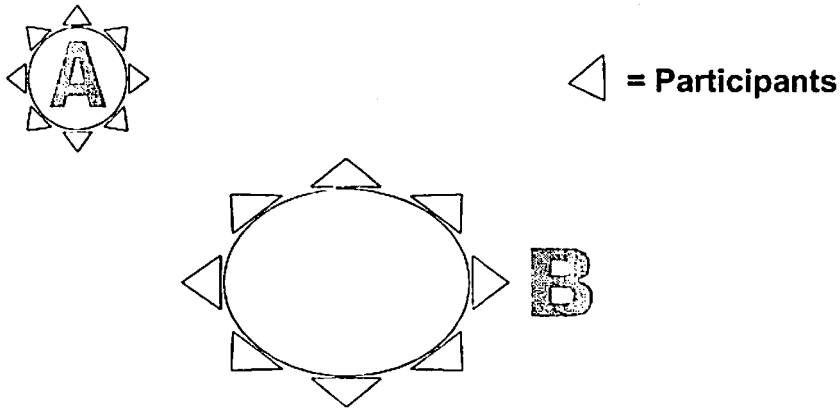
Triads or trios are an important configuration in small group work. They are small enough to provide privacy and intimacy and at the same time they are large enough to bring a multiple view-point. Small task force can be formed through triads. It improves communication, interaction and relationships. Communication dynamics is different in triads than dyads. Triads may be formed early in the extension or training program to work intermittently (small group work) and to serve as a support system.

The communication dynamics among a triad are quite different from a dyad. When two of the triad speaks, the third becomes an observer. Since there is an "observer" present, the remaining two partners become conscious of his presence and know they are being watched. They behave with greater reasonableness and courtesy. This social control serves to make the threesome more relaxed than the dyad. Third person in the triad may act as a mediator in case of conflicts.

The dynamics of a triad can make for a certain amount of conflict as well. One member may team up with another, producing an "odd person out" situation. This is more likely if the triad consists of two males and a female or vice versa.

The Fishbowl

This is an interesting, dynamic group involvement method. The particpants are divided in two groups, A and B, sitting in two circles.



A is the discussion group and B is the observation group. The inner group is given an assignment based on content, processing or content and processing. This group discusses the content for 10 to 30 minutes. After this, group B asks questions and give comments on group A's deliberations. Next, the roles are reversed for the groups and they change places as well. If any member feels strongly to speak out, he taps the shoulder of the nearest member inside the circle and exchange seats. Many fishbowls can run simultaneously. Their leaders subsequently form another fishbowl.

Fishbowl is used:

- As a problem solving tool
- As a tool to generate divergent views
- As a team building tool
- For improvement of inter-group relations and communication
- To resolve conflict
- For mid-program assessment
- For evaluation of out come of the group meeting

Problem members

Success f the group methods depends upon the quality of group members and how they behave during the interaction. While most members are cooperative and quite manageable, at times you will encounter a few problem types. Following are some of them:

The hesitant one (shy)

- Ask them easy questions
- Use dyads and triads
- Socialize with them during the break

The monopolizer (big talker)

- To avoid the big talker, ask for opinion of others
- Tell him, "Could we talk during break?"

The voice of experience (tremendous need to be heard)

- "Very interesting, but we have to move on."
- There may be genuine experienced persons in the group. Use their experience for the benefit of the group.
- Do not offend experienced people by cutting them short.

The arguer (tough kind)

- Ask the group, "Any one wants to respond to that?"
- No extension worker has ever won an argument with farmers
- "See me at the break" helps in breaking the tough kind.

The non-listener (Interrupts and cuts others off)

- Ask for restatement of the problem

The complainer (finds faults and blames others)

- Ask him, "Do you have any idea to cope with the problems?"

The hostile one (annoying)

- Keep cool and rephrase questions in a milder form

The negative one (sees gloomy side of things)

- Ask a member who could provide a positive side of the issue

The clown (joker)

- Ask him "Give me your idea"
- Tap and reward his serious side

The show-off (parades his/her knowledge in front of others)

- Let the group deal with him!

Check your progress:

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1. Which group methods you feel is effective in your situation?
2. What type of difficult persons have you come across in the meetings arranged by you?
3. How did you deal with them in the past? How would you deal with them now?

Small group exercises to be given to the trainers
Brain-storming and solution selection

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13. Build Social Capital through Extension

The new extension approaches aim at mobilizing communities to meet their socio-economic aspirations. This is not a "one-time" exercise for the extension agencies but has to be a continuous process. It may be with or without the presence of the extension agencies. Several methods have been used in building up social capital. Most effective and popular method is the famous **farmer-led extension.** This method meets the requirements of a participatory method that is more relevant to the community.

Farmer-led extension is an extension method which brings farmers to the main stream of extension system. Instead of any outside official agency leading extension system, the farmers themselves take lead in operating the same. It has been observed all over the developing world that the government-run extension services have not fully succeeded in improving farm productivity and rural peoples' standard of living. This is truer in case of small and marginal farmers and landless labor. The technologies transferred by the official extension agencies have often failed to make much impact on the farmers' fields.

Therefore, it is believed that farmers' self-managed extension services will be more effective. In the past one decade farmers, NGOs, governments and donors, especially in Asia, Latin America and Africa have been experimenting with several farmer-led models.

The main features of these models are as follows:

- Farmers become the main change agents in their respective communities.
- Farmers develop linkages with professional extension experts and subject matter specialists to have access to new technologies and solve farm related community problems.
- Farmers take many of the management decisions and also undertake day-to-day extension work.

Farmer-to-farmer extension is the most common form of farmer-led extension. **The most significant benefits of this approach are: language compatibility, relevance because of better understanding, prompt availability, accountability, credibility and sustainability.** Starting from Latin America as **campesino-a-campasino (farmer to farmer)** sustainable movement, it is active in South - East Asia and Africa.

Self-help groups (SHGs)

The popular mechanism in participatory extension in many developing countries is the formation of self help groups (SHGs). These are local interest groups that ensure involvement of all interest groups in the community. The SHGs transform into farmer's interest groups (FIGs) to represent different interest groups in a community. There can be more than one FIGs in a community. This mechanism can be adopted to diversify crop and livestock systems and increasing rural employment. The FIGs in many countries have focused on specific economic activities such as producing vegetables, spices, flowers, goats, chickens, dairy and fish, or products such as mushrooms, eggs, cheese, or ground spices. At most of the places SHGs and FIGs of women have performed well as far as the economic activities are concerned.

Example

Campesino -a-campesino (farmer-to-farmer) movement in Latin America

Farmers helping their brothers so that they can help themselves to find solutions and not be dependent on technicians and banks. The movement engages hundreds of volunteers and part - time campesino 'promoters' and the support of dozens of technicians, professionals and local development organizations. ***It is not a project but a movement with farmers as main actors.*** *They are involved in every stage off technology generation and transfer for*

sustainable agriculture. Farmers have helped each other by using simple methods of small - scale experimentation, combined with horizontal workshops in basic ecology, agronomy, soil and water conservation, soil building,seed selection, crop diversification, IPM and biological weed control. On the other hand, farmer promoters have inspired their peers to innovate and try new alternatives. This has given them conviction and pride to teach others, using local methods. By forging their own sustainable alternatives for agriculture, the farmer promoters have renewed belief in them, and campesino vision for the future of agriculture. have formulated a fresh

Some of the FIGs are composed entirely of women members. Such groups are termed as Women Interest Groups (WIGs). These local bodies become an alternate source of capital within the community for poor families who face an unexpected crisis or who need help starting a new enterprise.

Farmer field schools

Farmer field schools are yet another approach to farmer-led extension. These schools involve farmers in learning and discovering for themselves relationship between crops, pests, predators, soil and water in their fields. There is therefore an element of research in the field schools. These schools (these are only groups) also encourages farmers to share their methods and results through farmer-to-farmer extension. First started in Indonesia to undertake Integrated Pest Management (IPM) work, these schools have wide possibilities to include other areas of farming that require community participation. A field school consists of 15 to 20 farmers divided into subgroups of five or six for most of the field activities. The meetings of these groups are called as sessions. These sessions usually take place on a weekly basis, each session lasting about three hours. The group members study the condition of the crops and discuss future course of action. A subject matter specialist also helps them to select correct technical intervention. The schools are conducted throughout the entire growing season of the crop so that farmers can study all the stages of plant growth, as well as pests and other natural enemy life cycles.

The steps followed in conducting a field school are as follows:

- Agro-eco-analysis in small groups including weather conditions, plant growth, pest attack, weeds and plant diseases, etc.

- Farmers analyze and discuss the agro-eco-system in their sub-groups. Comparisons are made and extent of damage is assessed. Conclusions are made and decisions about crop management operations are taken.

- All sub groups present their findings in the larger group and final decision about action is taken.

- The farmer-trainers introduce new but relevant topics for discussion and lead the same. The group arranges "insect zoos" or other exhibits for the benefit of the group members

- The presentation made by the farmer trainers is not to lecture but develop group cohesiveness and encourage participation.

- Farmer field school is not to tell them what to do or which product to buy but a suggestive method.

This extension methodology is a very flexible and has a potential of including various aspects of farming.

Farmer-based extension program Agha Khan Rural Support Programme initiative, **India (AKRSP).**

- AKRSP introduced the concept of **Extension** Volunteers (EVs), a village level functionary selected jointly by village institutions and the AKRSP. These selected farmer volunteers are public spirited and keen learners of new ideas and issues.
- EVs sha re their skills and knowledge with others and involve in natural resource management activities.
- EVs motivate people to action, involve in participatory planning, implementation and management of different natural resource interventions.
- **Master Extension V olunteers** (MEVs) expand and speed up the extension process in the community.

There are various models of farmer-led extension developed by the farmers themselves. Some of the well known models are based on seed production and distribution among the farmers themselves. Whatever may be the reason for farmers to come together, a common feature of all the farmer-led models is the initiative taken by the farmers to take care of their own needs without much support from the official agencies.

As a consequence of the farmer-led extension, the local farming communities have become more demanding and are putting pressure on the official agencies to involve them in the extension process at every level. There is a visible trend towards formation of farmer federations starting from the village level up to the national level. They are already seeking powers to run extension system on their terms. However, the official machineries in many countries have resisted this demand.

Check your progress:

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1. In your opinion, how far the farmer-led extension is possible in your area of operation?
2. What steps you would take to introduce farmer-led extension in your area?


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