Programme- **B.Sc (Agriculture)**

Course - **Communication and Extension System**

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Unit- **2**

Topic- **Adoption and Diffusion of Agricultural Innovation**

Sub-topic- **Meaning and definition of innovation, diffusion, adoption, Diffusion effect and rate of adoption, Factors affecting adoption, Difference between diffusion and communication. Innovation decision process, categories of adopters, Characteristics of innovations.**

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Concepts of Communication and Diffusion:

Diffusion can be defined as a process by which an innovation is communicated through certain channels over a certain period of time among the members of a social system.

Leagans, J.P. (1961) defined communication as the process by which two or more individuals exchange ideas, feelings or impressions by which they gain a common understanding of the meaning of the message.

According to Rogers (1983), communication is the process in which participants create and share information with one another in order to reach mutual understanding.

Difference between Communication and Diffusion:

- Communication covers all types of messages whereas diffusion is concerned about the messages that of new ideas.
- A degree of risk on the part of receiver is present in diffusion which is not present in case of communication.
- In communication, the focus is on changing the knowledge or attitude of the people. In diffusion the focus is on overt change.
- Communication is broader in sense whereas diffusion is the special type of the communication.

Elements of Communication	Elements of Diffusion
Source	Innovators
Message	Innovations
Channel	Communication Channel (Mass media / Interpersonal)
Receiver	Members of social system
Feed Back (Effects)	Consequences Over a period of time

Adoption is a mental process through which an individual passes from first hearing of an innovation to its final adoption.

Elements of Diffusion Process:

- **Innovation:** Is an idea or practice or object that is perceived as new by an individual or social system. Gabrial Tarde has given the concept of 'S' shaped adoption curve. In this curve percentage of adoption is plotted against time.

- **Communication Channel:** Any diffusion process has an essential point that one individual having the knowledge of innovation and another one who is devoid of knowledge of innovation. Communication channel is the means by which knowledge is spread.

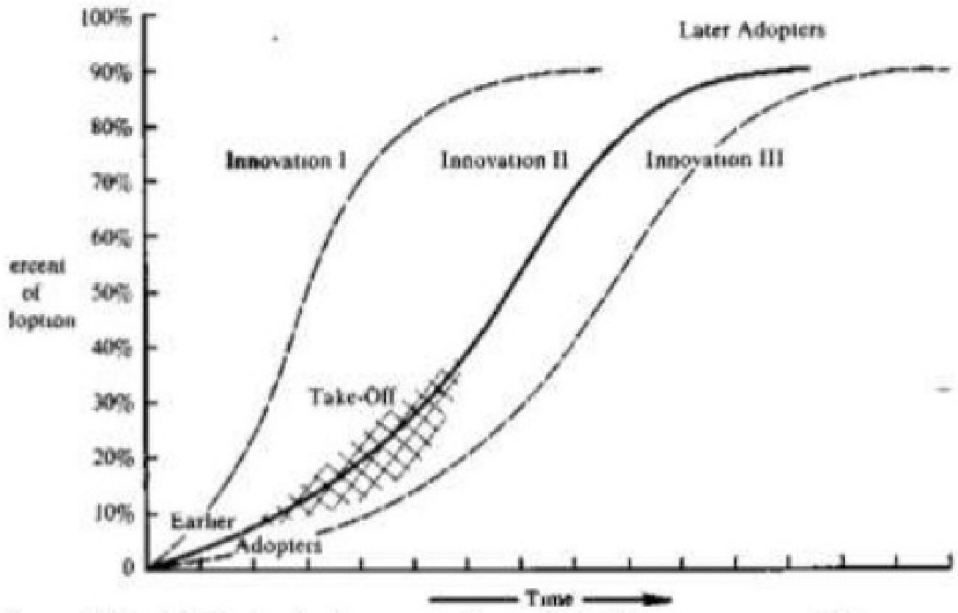
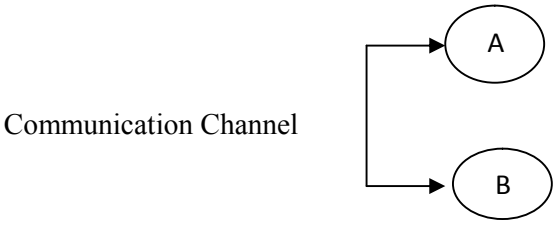


Figure 1-1. Diffusion is the process by which (1) an *innovation* (2) is *communicated* through certain *channels* (3) over *time* (4) among the members of a *social system.*

Concept of Homophily and Heterophily in Diffusion:
Lazersfeld and Merton (1964) has given the concept of Homophily and Concepts of Homophily and Heterophily in Diffusion Heterophily.



Homophily is the degree to pairs of individuals, who interact are similar in certain attributes such as belief, education, social status and values.

Heterophily is the degree to which pairs of individuals who interact are different in certain attributes.

- **Time:** Time is an important consideration in the process of diffusion. The time dimension is involved in the;
  - ✓ Innovation decision process,
  - ✓ The innovativeness of the individual, i.e., relative earliness - lateness in adoption,
  - ✓ Innovation's rate of adoption in a social system measured as the number of members of social system adopting the innovation in a given period of time.
- **Social System:** A social system is defined as a set of interrelated units engaged in joint problem solving approach to accomplish a common goal. Social system may be formal or informal. Kartz (1961) reported that it is unthinkable to study diffusion process without the knowledge of social structure and the norms. Norms are established behavior pattern by the members of a given social system. The social structure acts to impede or facilitate the rate of diffusion and adoption of new ideas through "system effect". Research traditions may be defined as the series of investigations on a similar topic in which successive studies are influenced by preceding

inquiries. Diffusion research is thus, emerging as a single, integrated body of concepts and generalizations, even though the investigations are conducted by the researchers in several scientific disciplines. The invisible college is an informal network of research which is formed around the intellectual paradigm to study a common topic. A paradigm is a scientific approach to some phenomena that provides model problem and solution to a community of scholars.

- **Diffusion Research Tradition**:
  - ✓ **Anthropology research tradition:** It deals with primitive human beings. It is probably the oldest among the nine diffusion research traditions. It has a distinctive methodological approach. It prefers to gather diffusion data by participant observations or non-participant observation or case study. The sample for the study is carried upon tribes. They have centered their research around the connections between culture and social change.
  - ✓ **Early Sociology:** It was started in late 1920 to early 1940. French sociologist Gabril Tarde was the pioneer of this research tradition. He was first to suggest the adoption curve (S - shaped). This may have induced quantitative data analysis.
  - ✓ **Rural Sociology:** It is sub-field of sociology that focusses on social problem of rural life. They contributed 791 diffusion publications till 1981. Ryan and Gross (1943) were among the pioneers in diffusion studies. They studied the diffusion channels used in diffusion of hybrid corn seed among the respondent farmers.
  - ✓ **Education:** Probably the best piece of educational research is Carlson's (1965) analysis of the communication of modern mathematics among school administrators in Pennsylvania and West Virginia. Educational diffusion often occurs within bureaucratic structures.
  - ✓ **Public Health and Medical Sociology:** This started around 1950. It studied the diffusion of new drugs and new medical ideas among the society.
  - ✓ **Marketing:** It studied diffusion of new consumer products among the society. Field experiments and surveying were main tools in their research studies.
  - ✓ **Geography:** It is unique in its emphasis on space as a factor affecting diffusion.

A Typology of Diffusion Research:

There are 8 types of diffusion researches.

- **Earlyness of knowing about innovation:** How people learn about innovation? A telephonic interview of 419 adults about Kennedy's murder revealed that early knowers came to know of the incident through mass media. Late knowers came to know from interpersonal channels. Approximately 5% of the diffusion studies belong to this category Green (1964).
- **Rate of adoption of different innovations in a social system:** Fliegel and Kevlin (1966) conducted a study of 229 Pennsylvania dairy farmers. The investigation used farmers' perception of 15 attributes, each of 33 dairy innovations to predict the rate of adoption. Innovations which were more economically rewarding and least risky, were adopted more than other innovations. Innovations that were more compatible were also adopted. It consists only 1% of total diffusion research.
- **Innovativeness:** Duetschemann and Falze Borda (1962) studied in Columbia village to test the cross cultural validity of correlate of innovativeness.

  Rogers (1961) indicated that innovativeness is highly correlated with higher education, greater size farm and cosmopoliteness. It consists 58% of the diffusion research.
- **Opinion Leadership:** The success or failure of any diffusion research depends on the role of opinion leaders and change agents. Rogers and Vans E. (1964) attempted to identify opinion leaders in 5 Columbian villages and social channels, communication behavior and cosmopoliteness and differences in these correlates of opinion leadership on the basis of systems with different norms. Opinion leaders were characterized by more formal education, larger farms, greater innovativeness, higher social status, more mass media exposure and higher literacy. It consists only 3% of the total diffusion research.
- **Who interacts with whom:** It is a neglected part of diffusion research. It consists less than 1% of diffusion research.
- **Rate of adoption in different social system:** Rogers and King Caid (1980) studied rate of adoption of family planning in 25 Korean villages. In certain villages some innovations were adopted at a faster rate. Those villages were having higher mass media exposure, extension worker penetration. It consists of approximately 2% of diffusion studies.

- **Communication channel usage:** Different communication channels plays, different roles in adoption process. Ryan and Gross (1943) studied mass media and reported it as the best media at knowledge stage. Interpersonal channels are best at persuasion stage. It constitutes 7% of diffusion research.
- **Consequences of Innovation:** It is a neglected part of diffusion studies. It consists of 0.2% of diffusion research.

Contribution and Criticism of Diffusion Research:

Contribution of diffusion research in the society is impressive. 1960–1970 can be marked with various diffusion research traditions.

Contribution:

United States Department of Agriculture, U.S. Department of Education had started the study of diffusion of innovations funded by the Federal Agencies. Multi-disciplinary nature of diffusion studies were conducted cut across different scientific fields. The focus of diffusion research was to trace spread of innovations through a social system. It had substantially contributed to understand the diffusion process.

Diffusion research incorporated time as an essential element in studying human behavior. Diffusion studies have emphasized on time as central focus of economies. Diffusion approach helped, connect research based innovation and potential users of such innovations. Diffusion paradigm allowed scholars from cross section of disciplines to assemble their findings in the form of higher level generalizations and the empirical studies.

Criticism:

- **Pro - innovation bias** is the most serious shortcoming. Most diffusion studies conducted considered adoption and diffusion but paid very little attention about rejection. We know much more about rapidly diffused innovation than the slower one, more about continuance than dis - continuance.
- **Individual blame bias** means always blame individuals rather than the system. Caplon and Malson (1973) reported that it is the tendency to hold individual responsible for his or her problems rather the system of which the individual is a part. Researchers must have an open mind as far as social problem is concerned. Past diffusion studies normally considered of audience research, not the Rand D system.
- **The recall problem:** We generally ask the respondent and he has to respond from memory. Depending upon the educational background and intelligence, he has to recollect. This may vary from person to person. In diffusion research, the innovations which are recently diffused should be included alternative source for verifying the respondent's data of adoption should also be considered. High quality of interviewing by trained person can overcome this criticism.
- **The issue of equality in diffusion of innovations:** Socio economic gaps widened with spread of different innovations. Large farmers were characterized with higher mass media exposure and innovative in adoption. Marginal farmers are considered as laggard.
- **Focus on optional innovation diffusion:** Past diffusion research focuses on optional innovation rather than with decisions of collective nature.

Innovation development process:

Innovation development process consists of all the decisions, activities and their impacts that occur from recognition of a need or problem, through research, development and commercialization of an innovation through diffusion and adoption of innovation by users to its consequences.

- **Stage I Recognizing a problem / need:** This process begins by recognizing a problem or need which activates Research and Development wing designed to create the solution.
- **Stage - II Research:** In diffusion research, the term technology as often used as a synonym for innovation. Technology a design for instrumental action that reduces the uncertainty in the cause effect relationships involved in achieving a desired outcome. Technology may be software and hardware.

  Basic research has been defined as original investigation for the advancement of scientific knowledge that do not have the specific objective of applying this knowledge to practical problems. Applied research consists of scientific investigations that are intended to solve practical problems. Applied researcher uses the principles of basic research. Invention is the process by which a new idea is discovered or created. Innovation occurs when a new idea is adopted or used.
- **Stage - III Development:** It is usually difficult to separate development from innovation. Development of an innovation is the process of putting new idea in a form that is expected to meet the need of potential adopter.
- **Stage - IV Commercialization:** Commercialization is the product, manufacturing, packaging, marketing and distribution of product that embodies the innovation. A technology cluster is two or more innovations which are

often packaged together in order to facilitate the diffusion, because several innovations have functional inter-relatedness. A technology cluster / innovation package consists of one or more distinguishable elements of technology that are perceived as inter - related.

- **Stage - V Diffusion and Adoption:** To begin diffusing the innovation to potential adopters, a decision is taken whether to hand over to a diffusing agency or directly to the users. Which innovation should be diffused, what should be the basis?
- **Stage - VI Consequences:** Often new problems may arise as a result of diffusion and adoption.

Adoption Process:

Adoption is not an instant decision. An individual passes through several mental stages in adopting certain idea. Adoption is a process through which an individual passes from first hearing of an innovation to its final adoption. Deway (1910) seems to be the first who proposed concept of stages in thinking. There are definite units that are linked together so that there is a sustained movement to a common end.

Ryan and Gross (1943): Adoption of new ideas proceeds in 4 distinct stages:

(a) Awareness,
(b) Conviction,
(c) Trial and
(d) Acceptance and Complete Adoption.

Pederson (1951): A sequence of events leads to adoption. Instead of acceptance and adoption, he used interchangeable terms without much distinction.

(a) Awareness,
(b) Conviction,
(c) Trial,
(d) Adoption.

Wilkening (1952) was the first to report 'adoption involves decision'. He defined adoption as a process comprised of learning, deciding and acting for a period of time. Wilson and Gallup (1955): They have listed 6 steps in the adoption process. They are:

(i) Attention,
(ii) Interest,
(iii) Desire,
(iv) Conviction,
(v) Action,
(vi) Satisfaction.

Sub - committee on diffusion of farm practices, North Central Rural Sociological Society (NCRSS) (1955) suggested about 5 stages of adoption process. They are

(i) Awareness
(ii) Interest
(iii) Evaluation
(iv) Trial
(v) Adoption.

Wilkening (1956) suggested 3 stages of adoption:

(a) Awareness
(b) Decision - making and
(c) Action.

The three stage model is more efficient for studying the role of change agents in communicating the technological change.

Beal et. Al. (1957):

(i) Awareness
(ii) Information
(iii) Application
(iv) Trial and
(v) Adoption.

They could not be validated.

Copp et. Al. (1958):

(i) Awareness

(ii) Interest
(iii) Acceptance
(iv) Trial and
(v) Adoption.

Emery and Oeser (1958):

(i) Information
(ii) Decision and
(iii) Action.

Rahim (1961): Used four stages of adoption in his study:

(i) Awareness
(ii) Information
(iii) Trial and
(iv) Adoption.

Information stages correspond to the interest and evaluation stage. Bose and Das Gupta (1962): They have suggested five stages:

(i) Awareness
(ii) Interest
(iii) Trial
(iv) Evaluation and
(v) Adoption.

Pareek (1962) suggested: Need being added as first stage in adoption. Nomenclature of evaluation may be changed to deliberation.

Lewing (1947): Three stages:

(i) Unfreezing
(ii) Moving and
(iii) Refreezing.

Most scholars conceptualized that awareness stage as "tentative evidence, suggests that awareness is more important". Leagans (1961) attached need as an important stage. An unfelt need to be converted to felt need and a program should be launched.

Singh and Pareek (1968): Proposed adoption model through a critical analysis on previous studies and empirical studies conducted in a village nearby Delhi. They proposed:

(a) Need
(b) Awareness
(c) Interest
(d) Deliberation
(e) Trial Evaluation
(f) Adoption.

Behavioural Characteristics of Farmers

- **Need:**
  (a) Farmer wishes the situation could be changed.
  (b) Expresses dissatisfaction to friends
  (c) Develops compromise.
- 2. Awareness:
  (a) Comes to know about which is related to his needs.
  (b) He is acquainted with the broad features of the innovation.
  (c) Knows the source from which the innovation is available.
- **Interest:**
  (a) Tries to know more about the innovation.
  (b) Asks extension specialist or friend.
  (c) Seeks more information.
  (d) Sees the innovation.
- **Deliberation:**

(a) Mentally examines the possibility of application under his situation.
(b) Seeks advice of opinion leaders.
(c) Observes the performance at different places (e.g., research farm).
(d) Discusses with the members of the family.
(e) Takes a decision to try out or reject.

- **Trial:** Puts into practice on a limited scale to observe the performance under his condition.
- **Evaluation:**

(a) Observes the performance of the innovations on various dimensions.
(b) Collects data on the performance of innovation on others fields
(c) Compares the performance of the new with that of the old.
(d) Figures out the other changes which will be necessary if the innovation is to be adopted. This may include balancing of inputs such as time, material, finance, etc.

- **Adoption:** Extends use in terms of time and extent.

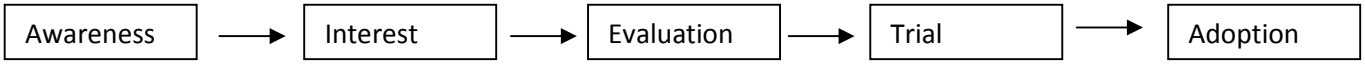
Adoption and Diffusion Processes:

The acceptance of a new idea is a complex process involving a sequence of thoughts and actions. Usually, decisions are made after multiple contacts with various communication channels. These contacts are made over a period of time.

According to Rogers, "Diffusion process is the spread of a new idea from its source of invention or creation to its ultimate users or adopter", whereas "Adoption process is the mental process through which an individual passes from hearing about an innovation to final adoption ".

These definitions indicating that diffusion is a process related to adoption of an innovation in an entire social system such as a village or block etc., while adoption is a sequence of thoughts and actions which an individual goes through, before he finally adopts a new idea.

A committee of rural sociologists suggested a five stage model in farm practices adoption.



The five stage model of adoption process which is more commonly accepted than other models is described below:

- ✓ **Awareness:** At this stage an individual becomes aware of some new idea but lacks details about it. For instance, the person may know only the name and may not know what the idea or product is what it will do or how it will work.
- ✓ **Interest:** At the interest stage, a person wants more information about the idea or product. The person wants to know what it is, how it works and what its potentialities are.
- ✓ **Evaluation:** At this stage, the individual makes a mental trial of new idea or practice. The person makes an assessment whether the idea is applicable to his own situation, and if applied what would be the result.
- ✓ **Trial:** The individual actually applies the new idea on a small scale in order to determine its utility in own situation. If, in the judgment of individual, the innovation has some plus points, i.e., applicable to own situation, and if applied shall in some way or other be of advantage, the person takes a decision to try it. These are generally small scale trials to test the effectiveness of the innovation in one's own situation. Apparently, individuals need to test a new idea even though they have thought about it for a long time and gathered information concerning it.
- ✓ **Adoption:** This final stage in the process is characterized by large scale, continued use of the idea, and most of all, by satisfaction with the idea.

These five stages are not necessarily a rigid pattern which people follow. They represent five sequences that can be clearly identified very frequently by both researchers and farmers. These stages are influenced by cultural differences and social factors as well as by the kind of practice, place and person. At any stage, recommendation can be thrown off. There can be jumping from one stage to another. If the farmers have confidence in the extension worker, and his recommendations, they may jump from 'evaluation' to 'adoption' stage.

Factors Affecting the Diffusion and Adoption of New Practices:

Following are the different factors which affect the diffusion of innovations or new practices:

(A) Social Factors; These include

(1) Locality groups: Groups are composed of people in a specific geographical area who have developed a feeling of belonging and who tend to associate with each other. Such groups are of two types - Neighborhood and communities. Neighborhoods establish norms which serve as guiding principles for those who live by norms of the larger society and

groups. Group pressures operate to keep people in line with local expectations regarding many aspects of life, including the adoption of farm practices. Adoption rates are higher in communities favourable to change than those who are not

(2) Family: Family members often serve as consultants in decisions to adopt new farm and home practices. Children in school are frequently mentioned by parents as sources of farm information. Wives pass on what they hear and see to their husbands.

(3) Social cliques: Social cliques are composed of small number of persons who accept each other as social equals and associate as close friends. Clique members communicate the farm and home information to these members.

(4) Reference group: Reference group is a group to which an individual refers when forming an opinion, making a judgment or deciding to act. Neighborhood and family constitute the most important reference group in farm practice adoption behavior.

(5) Formal groups: These include elected officers and committees. Those organized for the purpose of disseminating farm information's are likely to contribute directly to the end. All provide opportunities for meeting others who have similar interest and problems. Those most active in formal groups use more improved farm practices and are more exposed to a variety of direct sources for farm information. There is positive correlation between participation in formal social groups and adoption of new farm practices.

(B) Cultural Factors:

(1) Culture: Culture is the total man made part of man's environment. Behavior is often so distinctly modeled in accordance with a cultural pattern. Culture is also a partial determinant of what will be perceived and how.

(2) Values and attitudes: Values may be regarded as goal or objects to which people orient their thinking, action and feelings. Attitude may be thought of as predisposition to act, perceive, think and feel in relation to something. Family values found to be positively related to farm practice.

(C) Personal Factors:

(1) Age: Older farmers seem to be somewhat less inclined to adopt new farm practices than younger ones. Highest adoption of practices was found at middle age.

(2) Education: Farmers with high educational level adopt more improved farm and home practices than illiterate farmers.

(3) Psychological characteristics: Includes rationality, mental flexibility, and dogmatism, orientation towards farming and innovation proneness. The farmers who have such characteristics adopt more improved farm practices.

(D) Situational Factors:

(1) Farm income: Farmers having more farm income will adopt more farm practices than the farmers with low farm income.

(2) Farm size: Many technological advances require large size farm. Farmers with large size farms adopt more advance farm practices than small size holders.

(3) Tenure status: Owners can make decision to adopt new farm practices, but tenants must often obtain the concurrence of the owner before trial or use. Consequently, adoption rates are higher for farm owners than for those who rent their farms.

(4) Sources of farm information used: Farmers will adopt more improved agricultural practices than the farmers who have not used the sources of farm information.

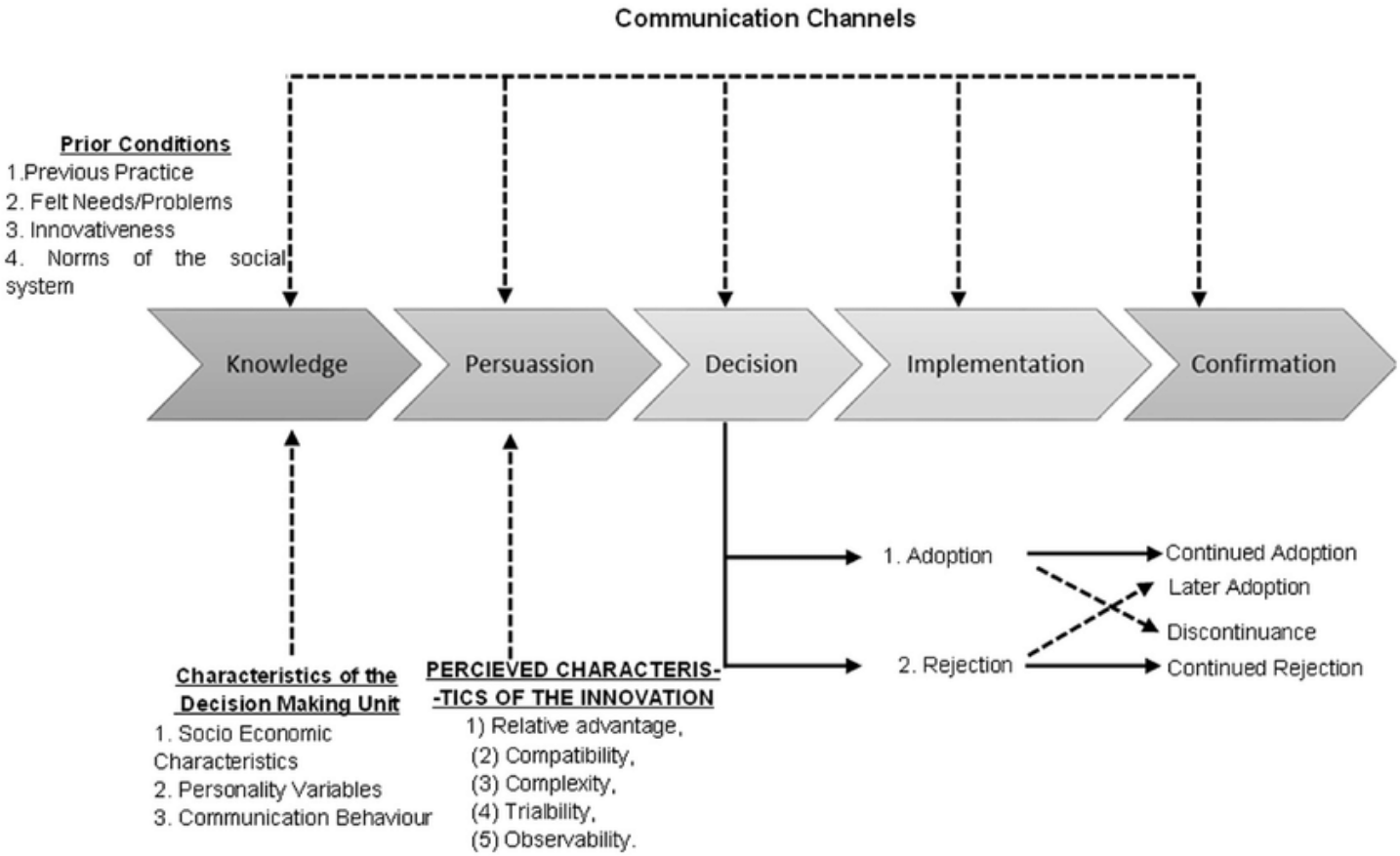
(5) Standard of Living: Farmers having higher level of living will adopt more improved farm practices than others whose level of living is low.

Innovation Decision Process (IDP):

It is the mental process through which an individual passes from first knowledge of an innovation to forming an attitude towards the innovation to a decision to adopt implementation of new idea and confirmation of his decision.

IDP differs from Adoption:

- ✓ Adoption process implies that all the individuals adopt the innovation rather than reject it. In IDP innovation may be rejected.
- ✓ Adoption process model does not allow the behavior which takes place after adoption, i.e.,
  - (i) Continued adoption, and
  - (ii) Rejection. IDP considers the after effects of adoption.
- ✓ Adoption process model fails to recognize the element of theory such as learning theory, decision - making theory, etc. Though it is concerned with learning theory it has not given enough consideration to the decision - making theory and the theory of cognitive dissonance.



- ✓ The basic emphasis of adoption model is individual decision process whereas IDP is much more comprehensive in scope and provides the types of decision - making, i.e., collective decision making and authority decision - making process.

❖ **Prior Conditions:**

- Previous Practice.
- Felt needs and problems.
- Individual's innovativeness.
- Norms of the social system.

Characteristics of the Innovation Decision - Making Unit

Stage: I-

- Socio - Economic characteristics
- Personality variables
- Communication behaviors

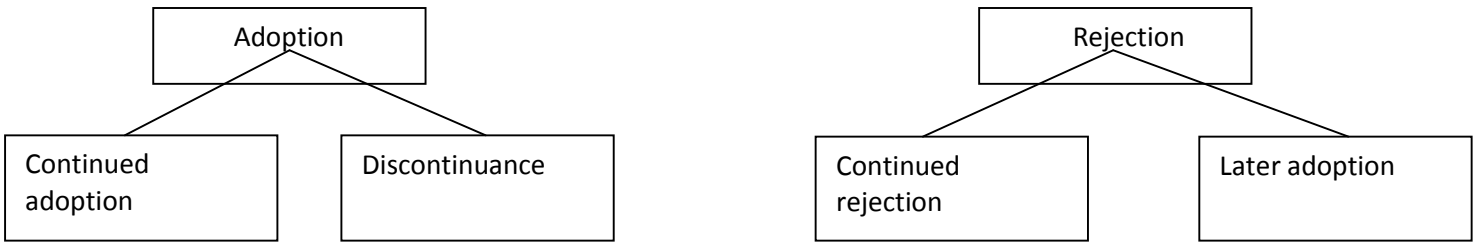
Stage: II-

Perceived characteristics of an innovation

- Relative advantage
- Complexity
- Compatibility
- Trialability
- Observability

Stage: III-

- May lead to adoption or rejection.



❖ **Knowledge**:

It occurs when an individual is exposed to the innovation and gain some understanding on how it functions. Awareness and interest - these two steps are merged in knowledge stage. Coleman et al (1966) gave more emphasis on awareness part rather than the interest part or need. Hestinger and others argued that seldom individuals get exposed to messages unless they first feel the need for the innovation. Selective exposure is the trend to attend the communication messages that are consistent with one's existing attitude and beliefs. Selective perceptions - the tendency to interpret communication messages in terms of one's existing attitude and beliefs.

Types of Knowledge:

- **Awareness knowledge:** The individual is exposed to questions such as, what is an innovation, advantage of using innovation.
- **How to knowledge:** Consists of information necessary to use innovation How to use it correctly?
- **Principles knowledge:** Information dealing with the functioning of the innovation, i.e., the theoretical aspect. Generally early knowers seek such information.

Early knowers:

More exposure to mass - media and interpersonal contact, cosmopoliteness help a person to be early knower. Characteristics of early knowers are similar to innovators. But it is not necessary that early knowers are always innovators.

❖ **Persuasion**:

In this phase an individual forms a favourable / unfavorable attitude towards an innovation which eventually may lead to adoption / rejection related to his attitude. Attitude is a relatively enduring organization of an individual's belief about an object that pre disposes his or her actions. In this stage individual actively seeks information of innovation, i.e, the attributes of innovation. The attributes, play an important role in this stage.

❖ **Decision Stage**

An individual engages in activities that lead to choice to adopt / reject innovation. Adoption is a decision to make full use of innovation as the best course of action available. Rejection is a decision not to adopt an innovation. Active rejection consists of considering the adoption of an innovation and then decides not to adopt it. Passive rejection consists of never really considering the use of the innovation at all. At this stage one tries to take all the alternatives in concern and choose the best course of action among them.

❖ **Implementation Stage:**

It occurs when an individual puts an innovation into use. It involves the overt behavior change. Usually individual adopts in a small scale and sees the suitability in his own condition. One sometimes modify the innovation in this stage. Reinvention is the degree to which an innovation is changed or modified by a user in the process of its adoption and implementation to make it suitable to his own condition. Re - invention is the distortion of original research product. Adopters think re - invention is good.

❖ **Confirmation:**

The individual seeks the reinforcements of the innovation decision already made, but he or she may reverse this decision if exposed to conflicting messages about the innovation. This stage may continue for an indifferent period of time. Throughout the confirmation stage, individual seeks to avoid a state of dissonance or at least to reduce it if it occurs. Innovation dissonance is the discrepancy in an individual's attitude towards an innovation and his decision to adopt or reject an innovation.

Festinger (1957) reported special type of cognitive dissonance. There is a pressure in the direction of dissonance reduction. This psychological state of dissonance is uncomfortable. Therefore the person seeks to reduce dissonance by bringing his attitude and action in line. Discontinuance is a decision to reject an innovation after having previously adopted.

- Replacement discontinuance is an idea rejected in order to adopt better idea which supersedes it.
- Disenchantment discontinuance is an idea rejected as a result of de-satisfaction with its performance.

▪ **Innovation decision period:**

It is the length of time required to pass through the innovation decision process. Early adopters take very less time than the late adopters. It is measured from the first knowledge of innovation until the decision to adopt or reject it. In reality we consider up to decision stage.

- **Types of Innovation Decision (ID)**:

Innovation may be adopted or rejected. Optional innovation decisions are the choices to adopt or reject an innovation that are made by an individual independent of other members of the system.

- **Individual is the unit of Innovation Decision:**

By and large past diffusion research focused on optional innovation decision rather than collective innovation decision. These are the choices to adopt or reject an innovation that are made by the consensus among of the members of the system. It will be implemented by all members of social system.

- **Authority Innovation Decision:**

These are choices to adopt or reject an innovation that are made by relatively few individual in a system, who possess power, status or technical expertise. Here individual member of system has little or no influence in the decision. They have to adopt.

- **Optional Innovation Decision:**

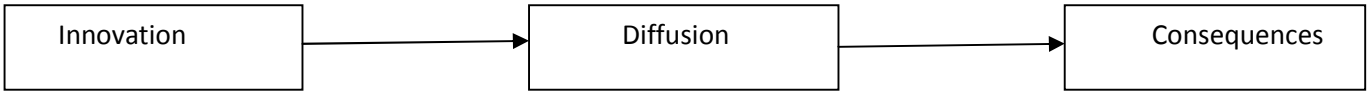
Where adopting individual has the complete role or responsibility of the decision.

- **Contingent Innovation Decision:**

These are the choices to adopt or reject the innovation that can be made after a prior innovation decision. Social system is involved directly in collective, authority and contingent Innovation Decision and indirectly to optional Innovation Decision.

- **Consequences of Innovation:**

Consequences are changes that occur within a social system as a result of adoption or rejection of an innovation.



Change agencies have over emphasized adoption assuming the consequences will be positive. Survey research method may be inappropriate in investigating consequences. Consequences are difficult to measure.

Classification of Consequences:

I

- **Functional:** They are the desirable effects of an innovation in a social system.
- **Disfunctional:** They are undesirable effects of innovation in social system.

II

- **Direct:** Those changes in a social system that occur in immediate response to an innovation.
- **Indirect:** It results from the direct consequences.

III

- **Manifest:** Changes that are recognized and intended by the members of a social system.
- **Latent**: Neither intended nor recognized in determining ideal rate of change the concept of equilibrium is to be used.
- Stable equilibrium occurs when there is almost no change in structure on functioning of social system.
- Dynamic equilibrium occurs when the rate of change a social system is commensurate with the system ability to cope with the changes.
- Disequilibrium occurs when the rate of change is too rapid to permit the social system to adjust.

Generally extension personnel or change agents try to achieve the dynamic equilibrium.

Adopter Categories:

In a social system if an innovation is introduced then it will not be adopted at exactly same time. It may be for the background of the members of social system. We can classify members of a social system into various categories by examining when they first come to know about innovation. It is the classification of the members of social system on the basis of innovativeness. Innovativeness is the degree to which an individual or a unit of adoption is a relatively earlier in adopting new ideas than other members of social system.

Rogers (1962) reported adoption of innovation follows a bell - shaped curve.

Many of human traits are normally distributed like a bell shaped curve. Hence a variable like degree of innovativeness follows bell-shaped curve (Fig.). Diffusion effect is the cumulatively increasing degree of influence upon an individual to adopt or reject an innovation. Researchers face three problems to standardize the adopter categories.

- Determining the number of adopter categories.
- Deciding on the portion of the members of social system to include them in each category.
- Determining the method of defining the adopter categories.

Basic criteria in adopter categorization are innovativeness. The categories should be:

- ✓ Exhaustive, i.e., it should include all the members of social system.
- ✓ Mutually exclusive, i.e., exclude from any other category a unit of study that appears in one category.
- ✓ Derived from one classificatory principle.

Adopter Categories:

- **Innovators (Venturesome, Advance Scouts, and Experimenters):**

They are eager to try new ideas always. Their venturesomeness leads them to payout new ideas. They have adequate financial resources. Communication patterns and friendship among clique of innovators are common. They are alert and actively seeking new ideas. They desire the hazardous, daring, risky jobs. They have ability to understand and apply complex technical knowledge. They are first to launch the new idea in the social system.

- **Early Adopters (Respectable):**

While innovators are cosmopolite, early adopters are localite. They are more integrated in the local social system than the innovators. Early adopters are respected by his / her neighbors. They are the individuals to check with before using the idea.

- **Early Majority (Deliberate):**

The early majority adopt new ideas just before the average member of social system. They interact frequently with their peers. But seldom hold leadership position. The early majorities unique position between the very early and the relatively late to adopt makes them as important link in the diffusion process. They provide interconnectedness in the systems network.

- **Late Majority (Skeptical, Doubtful, Suspicious):**

They adopt new ideas just after the average member of social system adopt. Social system experts pressure on them to adopt the innovation.

Late majority has very scarce resources. Sometimes they adopt because it may be of economic necessity. They wait to adopt the innovation when the uncertainty of the idea is completely removed.

Laggards (Traditional):

A person who lags is called laggard. They are the last to adopt in a social system. They are the most localite in their outlook. They are near isolates in social network. Decisions are usually made in terms of what has been done by previous generation. Almost no opinion leadership exists among them. They interact primarily with those who have traditional values. They are suspicious to innovations and extension agents. They finally adopt the innovation, which it may already be obsolete. They preserve old traditional culture.

Attributes of Innovation:

- **Relative Advantage**:

It is the degree to which the innovation is perceived as being better than the idea it supercedes. Individual in social system judges the innovation on some criteria:

- ✓ **Economic gain: Higher cost:** Benefit ratio of an innovation boasts its rate of adoption.
- ✓ **Labor saving devices:** Ferti-seed drill chemical weed control save labours. Adoption is higher for these technologies.
- ✓ **Immediate reward:** The result should be obtainable quickly, e.g. Amrapali (mango) 3rd year bearing Cross - bred cows milking early
- ✓ **Crisis situation:** In crisis, relative advantage is high and enhances adoption. e.g., Drought resistant variety.
- ✓ **Non-economic Aspects:** e.g., Recognition as first few adopts or first block to achieve a target.

Other dimensions are:

- ✓ Low initial cost of innovation.
- ✓ Lower perceived risk.
- ✓ Low degrees of discomfort

Relative advantage of new idea as conceived by the members of social system is positively related to its rate of adoption.

- **Compatibility:**

It is the degree to which an innovation is perceived as consistent with the current values, past experiences and need of potential adopters.

- ✓ **Compatibility with values and beliefs:** Every social system has certain criteria, values and beliefs. More the consistency with these norms and values of the system more is its likely rate of adoption, e.g., Muslims do not eat pork.
- ✓ **Compatibility with previously introduced ideas:** It should be consistent with ideas already present. Compatibility with the need of the adopters: Innovations should be based upon the felt need of the farmers. It will increase the rate of adoption.
- ✓ **Technology clusters:** A package of innovation will go together more smoothly rather than the innovations alone, e.g. Package of practice for wheat and rice.

- **Complexity:**

It is the degree to which the innovation is perceived as relatively difficult to understand and use. e.g., IPM technologies are relatively complex. Hence, the complexity of the innovation as perceived by the social system is negatively related to its adoption.

- **Trialability**:

It is the degree to which the innovation may be experimented on a limited basis. Innovations that can be tried are generally more accepted faster than the innovation that cannot be tried in parts, e.g., bio - gas plant. It is positively related to its rate of adoption. In case of early adopters, trialability is more important than in case of late adopters.

- **Observability:**

It is the degree to which the results of innovations are visible to others. The result of some innovation can be easily observed and communicated rather than some others. e.g., Application of urea for fast growth. The observability of an innovation as perceived by the members of social system is positively related to the rate of adoption.

- **Rate of Adoption**:

It is the relative speed with which an innovation is adopted by members of a social system. It is generally measured as number of individuals who adopt a new idea in a specified time period. Interaction among the members of social system creates interaction effect. This interaction effect creates social pressure which in turn accelerates its rate of adoption. So interaction is the pre - requisite for the social pressure which is pre - requisite to rate of adoption.

- **Over Adoption**:

Adoption of innovation by an individual when experts feel that he / she should rejects, called as over adoption.

Factors Affecting Rate of Adoption:

- ✓ Perceived attributes of innovation.
- ✓ Type of innovation decision;
  (a) Optional
  (b) Collective
  (c) Authority
- ✓ Communication Channels:

(a) Mass media
(b) Interpersonal

- ✓ The nature of the social system:
  (a) Degree of communication
  (b) Integration
- ✓ Extent of change agents in promotional efforts.

Reference Books		
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2.	Fundamentals of Extension Education and Rural Education	Dr. Jitendra Chouhan
3.	Communication and Diffusion of Agricultural Innovation	Dr. S.K. Arun, Dr. B.D. Tyagi