NATIONAL OPEN UNIVERSITY OF NIGERIA

SCHOOL OF SCIENCE AND TECHNOLOGY

COURSE CODE: AEM: 503

COURSE TITLE: DIFFUSION AND ADOPTION OF INNOVATIONS

COURSE GUIDE

AEM: 503

Diffusion and Adoption of Innovations

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Content Page

What you will Learn in this Course

Welcome to AEM 503 Diffusion and Adoption of Innovations Course!

You are beginning a course about how innovations are ddiffused adopted. The course is made up of twelve study units. Your study time for each unit will vary from one to four weeks. You will find more detailed information about the contents of each unit in the section of this Course Guide entitled "Course Description". Each study unit contains a number of self-tests. These allow you to check your progress as you work through each topic. At the end of each self-test is a question about your own experience. It is advisable that you think very well about these questions. You are requested to apply the material you have just read to your experience in your Local

Government Area or the country. All the questions are discussed in the final unit and tutorials. Some of your recommended textbooks are written by non- Nigerians. You will therefore, judge whether all or some of the materials contained in them apply in the Nigerian environment. Your opinion here therefore, matters a lot, as there are various answers to these questions. You will learn some new terms and expressions during the course of the study. You will also come into contact with new ideas, which may make you look at the concept of iinnovations from an entirely different perspective.

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The study units, textbooks and exercises will help you master the topics over a period of about 18 weeks. Before looking at study units or your textbooks, you should read this **Course Guide** thoroughly. It tells you:

• The aims and Objectives of the course

• What the course covers.

• The components of the course.

• The amount of study time you need to cover the course successfully.

• How your performance in assignments and the examination will be assessed.

• How the tutorial system works.

You will probably need to refer to this Course Guide throughout the course to clarify important points about studying with the National Open University (NOU) of Nigeria

Course Aims

Diffusion and Adoption of Innovations aims to provide you with the basic introduction to processes of diffusion, adoption and innovation, as well as diffusion of innovation. It also intends to identify characteristics of innovation, rate of adoption, adopter categories as well as the roles of opinion leadership and Change agents. At the end of the course we shall be able to identify the factors enhancing effective agricultural extension in rural areas

An integrated approach is used in the study of Diffusion and Adoption of Innovations in which both national and locally specific aspects are examined. National and local experiences are highlighted to illustrate certain issues.

Course Objectives

After the course has been completed, you should be able to:

1. Define diffusion and enumerate the elements of diffusion,
2. Explain the processes of adoption and innovation, as well as diffusion of innovation
3. Identify characteristics of innovation, rate of adoption and adopter categories
4. Differentiate between leadership and Change agents
5. Attempt to theoretical formulation on the diffusion of innovations and Implication of these processes

Course Description

One of the most important functions of Diffusion and Adoption of Innovations is to bridge gap between research centers and the farmers for introduction of improved technologies or methods of agriculture. In other words successful communication is the main job of an extension worker. An extension worker's job does not end with merely informing the farmers about improved

practices, he should ensure practical application (by the farmers) of the result of research and field trials. Extension officer's efficiency can be measured:

(a) By the speed or quickness with which the gap between what is known and what is done by the farmers is bridged.

(b) By the number of new practices adopted; and

(c) Also by the number of farmers and communities that adopt the new practices.

There are fifteen study units in this course:

Unit 1: Definition of Diffusion

Unit 2: Elements of diffusion

Unit 3: Process of adoption

Unit 4: Diffusion of innovation

Unit 5: Innovation Model

Unit 6: The innovation decision process

Unit 7: Characteristics of innovation

Unit 8: Factors Determining the Rates of Adoption

Unit 9: Adopter categories

Unit 10 Opinion leadership

Unit 11: Change agents

Unit 12: Theoretical formulations on the diffusion of innovations

Unit 13: Sectors related to differential rates of adoption of new agricultural technology;

Unit 14: Implication of these processes

Unit 15: Factors of effective agricultural extension in rural areas

The units build on each other to work from explaining what diffusion, innovation and adoption are to how you can become a change agent by applying all that you have learnt in this course. If you have completed the pre-requisite courses, you will find certain concepts in some familiar units. But if you have not completed the pre-requisite courses, you may need to spend a little extra time familiarizing yourself with some of the ideas.

However, this should not create any problems for you.

In this course, you shall be made to understand that bringing about change requires the organization of an innovation process. The process of diffusion and adoption of innovation has therefore provided an important basis for extension education especially in the fields of agriculture, health services and consumer behaviours.

There are adequate tutorial hours designed to assist you, try gain full advantage from tutorials you need to be up to date with your study. Tutorials are not lectures but are designed to allow group discussion and input. You get the most from a tutorial session, if you contribute your ideas and opinions. Tutorials do not assist learners when they make no input. Your tutor will lead discussions and needs your help to make sessions successful.

The **Course Calendar** provides an overview of the course. It suggests the amount of time you should use to complete the units and helps you to plan your study schedule. It can be adjusted to fit your personal needs more closely.

The time needed to complete the study units, work through the practice exercises and assignments, and complete the other work involved in this course depends on your analytical ability and background. You need to plan your own study schedule carefully. The estimated time

you need to spend on this course is about 10 hours per week. This estimate includes time for reading the study units and studying the textbooks, completing self-tests and practice exercises, completing your assignments, undertaking the suggested reviews, attending tutorials and preparing for your final examination.

You must complete and hand in your written assignments on time. Therefore, you need to plan and distribute your study time accordingly. There are four assignments known as Tutor Marked Assignment (TMAs) altogether to be marked by your tutor. One of these TMAs is required (i.e. you must hand your assignment to gain the specific amount of Overall Continuous Assessment Scores (OCAS) that is assigned to this TMAs). Other than this, the best three out of the other four will be counted towards your usual OCAS. You can find more information on assignments in a later section of this **Course Guide**.

Course Material

In addition to this Course Guide, there are the following important components of the course. At this time, please ensure that you have all of these materials available and can identify the various components in the course if you do not have the NOU- produced materials, you should contact the NOU immediately. The textbooks, however, are your own responsibility. These can be obtained from the Academic and professional book centers: The addresses for the branches are in the book list that is sent to you.

Study Units

Although we have recommended the amount of time you should spend on each study unit, you may prefer to study material in a slightly different way. There is provision to detour from the

pattern of the course, but you must complete the practice exercises, assignments and examination successfully. The course is structured so that each unit builds upon previous knowledge.

Each unit includes at least seven different ways to help you study Diffusion and Adoption of Innovations.

These are:

1. Reading the study unit

2. Reading the textbooks

3. Testing your comprehension and analytical skills by working through the self- test Questions which appears throughout the units.

4. Undertaking the activities that appear throughout the units. These activities will ask you to think, observe, or under take some activities designed to help you apply your knowledge to your own experience.

5. Completing the practice exercises in each unit.

6. Preparing and writing problem-solving assignment

7. Asking you questions about your own experiences. Your answers help you link your experience to the course material and to Nigerian culture.

You must read each unit carefully. It provides a commentary on the textbooks and introduces you to additional material. Each unit also tells you how and when to complete your assignments. If you don't read the study units carefully, you may miss important information. Your study notes are designed to guide you through your textbooks.

You must read both the study notes and the texts. They are not alternatives to each other.

It is also helpful to read as widely as possible. Try to read articles in newspapers and journals, other books on the topic, and related cases. The more you read, the better your appreciation and understanding of the subject will be.

Each unit directs you to read specific pages from chapters in the textbook. You are expected to study and understand the principles and concepts involved. Each unit contains self-test question, usually short ones, providing a duck on your understanding of a technique or principle you have just read about. By attempting these short questions, you will have instant feedback on your progress. You should attempt to answer all the self-text questions before looking at the answers. This will help you to prepare for your assignments and examination. After each self-test there is a question on your own experience!

At the end of each unit there is one practice exercise, which covers all areas you have studied in that unit. It is important to complete all the practice exercises. This will expose you to the types of questions you will be required to answer in assignments and in your final examination and also introduce you to some problems encountered in business, organizations and real life-situations. The questions reflect the demands of the unit objectives; they are designed to help you understand and apply those principles covered in the unit.

Set Text Books

There are no compulsory textbooks for **Diffusion and Adoption of Innovations**

Read as many textbooks, newspaper/journal articles on the subject as possible

Assignment File

Assignment questions for the units of this course are contained in the section of the course materials entitled Assignment file. You are required to complete your assignments and mail them together with a tutor-marked assignment (TMA) form to your tutor.

Course Assessment

Your assessment for this course is made up of two components:

- tutor-marked assignment (TMAs)
- a final examination

The practice exercise is not part of your assessment but it is important to complete all of them.

Tutor-Marked Assignments

This course has four assignments, which you will find in your Assessment File with detailed instructions on how to complete them. Your tutor will mark and comment on them. Pay attention to the feedback and use it to improve your other assignments.

You will see from the course time table the dates to submit in your assignments. The marks for the required TMAs and the best three out of four will be recorded and count towards your final mark for the credit for this course. Presently, the university has adopted electronic e-TMA which comprises eighty multiple or objective questions since 2009/2010 session.

You can write the assignments using the materials from your study units and textbooks. But it is preferable in all degree level education to demonstrate that you have read and researched more widely than the required minimum. Using other references will give you a different viewpoint and a deeper understanding of the subject. **But do remember that copying from any sources without acknowledgement is plagiarism and is not acceptable.** You must make reference

when you refer to or quote from others' work. The minimum information needed is: author's name, date of publication, title, edition, publisher and place of publication.

The nature of the assignments varies, but they normally consist of either case **studies or questions** relating to the cases, short essays or short answer questions. It is useful to illustrate any theoretical points with examples from your own experience. This allows you to demonstrate your understanding of the application of theory to real life situations

Below are the total marks allocated to the assignments and to your final examination:

Title	**Value**
TMA	30%
Exam	70%
	100%

Final Examination and Grading

There is three-hour examination at the end of this course. Use the time between finishing the last unit and the examination to review the whole course. Review your practice exercises and assignments and your tutor's comments on them before sitting for the examination. You will be advised of examination arrangements after you send in your examination registration card.

The final examination for AEM 503 Diffusion and Adoption of Innovations covers information from all parts of the course and has the same format as the specimen examination paper, which will be discussed in the half-day school. The examination will not contain "trick" questions or questions that try to confuse you. That is, not consistent with the open approach, the NOU approach is difference. To earn a passing grade for the course you must submit at least three

TMAs including the required TMA, and attain a passing grade (i.e. at least score 40) on these **and** on your final examination.

Tutor and Tutorials:

Your tutor marks and comments on your assignments, keep close watch on your progress and on any difficulties you encounter, and provide you with assistance.

Assignments should be mailed in accordance with the **course calendar**. They will be marked by your tutor and returned to you as soon as possible.

It is a good idea to keep a copy of all the assignments you send to your tutor for marking. The copies will prove useful, should you wish to make reference to them during telephone conversations, or if they are lost in the mail.

Do not hesitate to contact your tutor by telephone if you need help. Here are typical circumstances in which help is necessary. Contact your tutor if:

• You do not understand any part of the study Units or the assigned readings

• You have any difficulty with self-tests or practices exercises

• You have a question or problem with assignments, with your tutor's comments, or grading on an assignment.

Tutors have complete authority on two points. First, they are responsible for the grade you receive on assignments. If you disagree with a mark, discuss it with your tutor.

Second, they alone decide if you may or may not rewrite an assignment.

To assist you in this course, regular tutorials are organized with your assigned tutor.

Very interesting activities are designed for the tutorials. They also give you an opportunity to sort out any problems. You will be notified of their dates, times, and location, together with the name and phone number of your tutor, as soon as you are allocated a tutorial group. We strongly

recommend that you attend these tutorials and the half-day school. They provide considerable assistance in your study of this course and improve your chances of gaining high marks. They also let you meet other learners studying through the NOU.

Tutors are required to start tutorial day school sessions on time. If a tutor fails to turn up 30 minutes after the scheduled starting time, students may assume that the session is cancelled and they should report the case to the course coordinator so that a make-up session can be arranged.

TMA extension Policy

The assignment policy of the University as stated in the student Handbook should be observed. Applications for extension of up to seven days should be submitted to the tutor. For extensions of over seven days, students should note the following:

1. Assignment extensions may be granted in extenuating circumstances, which should be interpreted as circumstances that are unexpected. Work commitments and traveling are not regarded as extenuating circumstances unless they are unexpected.
2. Supporting documents must be submitted along with the application for extension of over seven days to justify the claim. Applications without supporting documents will not be considered.
3. Applications for extension should be submitted either before or on the due date.
4. The decision to grant or refuse an extension is made by:

   * The course coordinator for extensions of up to 21 days;

   * The Dean for extensions of over 21 days.

If the assignment is posted to the tutor, it is the responsibility of the student to check with their tutor that the assignment has successfully arrived. Extension applications without supporting documents on the ground of postal loss will not be accepted. The University cannot accept any responsibility for assignments that are not received by your tutor due to problems with the post. As a precaution, you are advised to keep a copy of each assignment you submit and obtain a certificate of posting from the post office when you post your assignment.

Conclusion

AEM 503 Diffusion and Adoption of Innovations is a subject that should interest anybody who is concerned about the quality of life in the rural areas either in Nigeria or any Third world Country of Africa and Asia. The course has therefore, been designed to help you understand the most complex problems of the developing nations which is that of modernizing the rural areas. It requires both conceptual and analytical skills. You must analyze and apply concepts to understand the nature and philosophy of Diffusion and Adoption of Innovations.

Hopefully, you will find it fun, interesting and useful as an administrator or a policymaker (or potential ones) interested in the development of your country. Good luck, and enjoy the course.

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Unit 1 Definition of Diffusion, Innovation and Adoption

Table of Contents:

1.0 Introduction

In this unit you will be provided with the general background information by introducing you to the definitions of diffusion, innovation and adoption. Diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system. The origins of the diffusion of innovations theory are varied and span multiple disciplines. Rogers defines an innovation as "an idea, practice, or object that is perceived as new by an individual or other unit of adoption and to adopt an innovation means to acquire a new product or behavior.

2.0 Objectives

At the end of this unit, you should be able to:

- Define the concept of diffusion
- Explain the concept of innovation
- Define the concept of adoption
- Differentiate between diffusion and adoption

3.0 Main Content

3.1 Definition of Diffusion

Diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system. It is a special type of communication concerned with the spread of messages that are perceived as new ideas. In today's world, information technologies such as the Internet and cell phones – which combine aspects of mass media and interpersonal channels, represent formidable tools of diffusion. It is this 'newness' of the idea in the message content of communication that gives diffusion its special character.

3.2 Definition of Innovation

An innovation is an idea, practice, or object perceived as new by an individual or other unit of adoption. An innovation is an idea, practice or object that is perceived as new by an individual or other unit of adoption. The technologies, practices developed through research are innovations. These may be new varieties of crops and plants, new breeds of livestock or fish species, new chemicals and medicines, new technique of doing things

etc. Farmers themselves may develop some new practices, which are also innovations. Irrespective of the time period the idea or practice was originally developed, when a person first become aware of it, it is an innovation to that person. There are two categories of innovation/technologies namely: material and knowledge based technology

I. Knowledge Based Technology

Within the context of knowledge based technology, "adoption" refers to the stage in which a technology is selected for use by an individual or an organization. "Innovation" is similarly used with the nuance of a new or "innovative" technology being adopted. "Diffusion" refers to the stage in which the technology spreads to general use and application. "Integration" connotes a sense of acceptance, and perhaps transparency, within the user environment.

Typically, past adoptions of a new technology for education have signaled a confidence in its potential to alleviate a particular problem or to make a job easier or more efficient. Rarely has bringing about new social and functional conditions been a consideration. Internet and World Wide Web technology, however, may provide a means of creating totally new learning environments, and it may be to that end that adoption is initiated. In such instances, "innovation" and "adoption" may be seen as virtually synonymous elements of the adoption/diffusion process.

Since early in this century, various "new" educational technologies have been touted as the revolutionary pedagogical wave of the future. Classroom films, programmed learning devices, language laboratories, educational television, computer-assisted instruction and, more recently, interactive videodisc technology have been adopted and integrated into the curriculum with varying degrees of success. Each technology was widely perceived as meeting a need, and each

gained a measure of initial commitment of resources from a high level administrative or legislative entity. Their adoption and diffusion process generally followed what has been termed the "traditional model," a "top-down" process in which administrative "mandate" introduced the technology and administrative perceptions, decisions and strategies drove adoption and diffusion. Successful adoption was highly dependent on the degree, stability and wisdom of administrative sponsorship.

None of these technologies, however, has been generally available for individual or private use due to cost, scope or application. This deterred a "grass roots" technology adoption cycle as it was nearly impossible to generate movement from the bottom up by influencing faculty peers and administrators with demonstrations of successful applications.

Today's educational generation, however, sees personal computers, the Internet and the World Wide Web as technology's new wave. Proponents of distributed learning environments and distance learning on the World Wide Web forecast dramatic innovation at all levels and in all areas of education. And although this enthusiasm is reminiscent of that of past innovators, there are significant differences in the nature of this technology revolution in education and that of earlier ones with corresponding implications for adoption and diffusion.

Unlike earlier technologies which were thrust upon the education community, Internet technology is individually available to faculty and students who can use their own systems to serve their own purposes. The impetus for the innovation frequently grows from individual users of the technology, and as their communication and influence moves laterally through their contacts, a body of support can grow and exert "pressure" on the institutional administration to

commit to adoption of the technology. There is, therefore, a high potential for a "bottom-up" or "grass roots" adoption process to succeed.

Indeed, Everett Rogers (1986), considered by many the "guru" of adoption/diffusion research since publishing Diffusion of Innovations (now in its fourth edition) in 1960, reveals three important ways in which the adoption of interactive communications differs from that of previous innovations. 1) A critical mass of adopters is needed to convince the "mainstream" teachers of the technology's efficacy. 2) Regular and frequent use is necessary to ensure success of the diffusion effort. 3) Internet technology is a tool that can be applied in different ways and for different purposes and is part of a dynamic process that may involve change, modification and reinvention by individual adopters.

Internet technology actually embodies a number of technologies--e-mail, databases, chat rooms, information and education resources, among others. Additionally, the Internet exhibits many elements that constitute a culture or community--language, symbols, rituals, interaction, and other elements of communication. It thus essentially becomes an environment into which users enter (December, 1993; North, 1995). "Visionary" innovation and "pragmatic" application can begin with grass-roots enthusiasts who enter this environment. Viewed as a culture or community, however, the Internet can be perceived as a threatening competitor to the established norms of an existing culture or community, such as an academic department or some other institutional entity.

II Materials Innovation Technologies

This develops innovative technical solutions for the manufacture of complex-shaped performance composite parts. It advances materials such as carbon fiber, aramid fibers, fiber glass, natural fibers, and hybrids, along with proprietary manufacturing processes to successfully develop solutions for the emerging technology needs of the Aerospace, Automotive, Defense, Mass Transit, and Recreational Sporting Goods markets, just to name a few. We offer extensive knowledge in product development and commercialization.

3.3 Definition of Adoption

According to Rogers (1995) Adoption process is a mental process through which an individual passes from hearing about an innovation to final adoption. The adoption of a practice is not a unit act and instantaneous. The farmer's decision to accept or reject adoption of science based production technology consists of several stages and involves sequence of thoughts and decisions.

3.4 Differentiation Between Diffusion and Adoption

Diffusion is a social process while adoption is a mental and is individual process. Diffusion and adoption are thus closely interrelated concepts and processes.

4.0 Conclusion

The spread of an innovation within a social system is called diffusion and adoption is a decision to make full use of an innovation as the best course of action available. An innovations is essentially a new technology or idea of doing something

5.0 Summary

In this unit we have been able to define diffusion, innovation and adoption as well as differentiate between the first and the third. These definitions are crucial to what we shall discuss in the next units.

6.0 Tutor-Marked Assignment

Differentiate between diffusion, innovation and adoption.

7.0 References/Further Reading

Ban, A. W. Van den and Hawkins, H. S. Hawkins (1996) *Agricultural Extension*, Blackwell Science, Second edition, 294p

Leeuwis Cees (2003) *Communication for Rural Innovation: Rethinking Agricultural Ex Rogers, E.M. (1995). Diffusion of Innovations (4th ed.). New York: Free Press.tension*, CTA, 412p

Unit 2

Elements of Diffusion

Table of Contents:

1. Introduction

Most individuals do not evaluate an innovation on the basis of scientific studies of its consequences, although such objective evaluations are not entirely irrelevant, especially to the very first individuals who adopt. Instead most people depend mainly on subjective evaluation of an innovation, conveyed to them from individuals like themselves who have previously adopted the innovations. This dependence on the experience of peers which indicates that diffusions is a social process and the heart of diffusions process consists of the modelling and imitation by potential adopters of their network partners who have adopted previously. We shall discuss in details the elements of diffusion in this unit.

2. Objectives

At the end of this unit you should be able to

- Enumerate the elements of diffusion
- Identify the role of these elements in adoption of innovations.

3.0 Main Content

3.1 Elements of Diffusion

The four main elements involved in diffusion are as follows:

1. Innovation
2. Communication Channels
3. Time
4. Social System

We shall now discuss in details about these four elements of diffusion.

3.2 Role of Elements in Adoption of Innovations

3.2.1 Innovation

An innovation is an idea, practice, or object that is perceived as new or an improvement over the existing one by the individual or members of a social system. If the idea seems new, it is an innovation. The innovation may represent a slight modification of a significant departure from, the existing idea or practice. The “idea” constitutes the central element of an innovation which often manifests itself in a material or behavioural form. Most agricultural innovations manifest a material form, which includes improved

implements, high- yielding and disease resistant seeds, hardy and fast growing fish, bio-fertilizers, botanical pesticides and herbicides. Some innovations manifest themselves in behavioural forms such as improved cultural practices.

3.2.2 Communication Channels

A communication channel is the means by which messages get from one individual to another. Mass media channels are all those means of transmitting messages that involve a mass medium such as radio, television, newspapers and others, which enable a source of one or a few individuals to reach an audience of many. On the other hand, interpersonal channels are more effective in persuading an individual to accept a new idea, especially if the interpersonal channel links two or more individuals who are similar in socio-economic status, education, or other important ways. Interpersonal channels involve a face-to-face exchange between two or more individuals.

3.2.3 Time

The third element in diffusion process is time. Time is involved in diffusion in

- The innovation – decision process
- Innovativeness
- Innovation's rate of adoption

The innovation – decision process is the mental process through which an individual or other decision making unit passes from first knowledge of an innovation to forming an attitude towards the innovation, to a decision to adopt or reject, to implementation of the new idea, and to confirmation of this decision. We conceptualize five steps in this process

(i) knowledge, (ii) persuasion, (iii) decision, (iv) implementation, and (v) confirmation. An individual seeks information at various stages in the innovation – decision process in order to decrease uncertainty about innovation's expected consequences. The decision stage leads to adoption, a decision to make full use of an innovation as the best course of action available, or to rejection. We shall discuss this in the next unit under the adoption process.

Innovativeness is the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a social system. Based on innovativeness, the adopters can be classified into five categories: (i) innovators, (ii) early adopters, (iii) early majority, (iv) late majority and (v) laggards. In unit 8, the adoption categories shall be discussed.

Rate of adoption is the relative speed with which an innovation is adopted by members of a social system. The rate of adoption is usually measured by the length of time required for a certain percentage of the members of a system to adopt an innovation. It is a system perspective rather than an individual as a unit of analysis. There are differences in the rate of adaption for the same innovation in different social system. The various criteria that influences adoption rate will be discussed in unit 7.

3.2.4 Social System

A social system is defined as a set of interrelated units that are engaged in joint problem solving to accomplish a common goal. The members or units can be individuals, informal groups, organizations, or sub systems. The sharing of common objective binds the system together. Diffusion occurs within a social system. The social structure of the system

influence how and what information is disseminated. Knowledge of social structure is important to consider while studying diffusion. A village as a social system is made up of a variety of individuals and groups with distinctive statuses, roles, norms and goals all of which functionally relate to each other to attain its major goals and objectives. The structure of a social system constitutes a set of boundaries within which innovation diffuse. The differences in the adoption of agricultural innovations at the village level can often be explained in terms of their differences in structural characteristics. The degree to which a village is structurally homogeneous or heterogeneous, affects the rate of diffusion of agricultural innovations within its boundaries. The information can be distributed through formal (Government) and informed communication structures (peers, groups etc.).

4.0 Conclusion

The four main elements involved in diffusion affect level and rate at which an innovation is adopted. The rate of adoption is usually measured by the length of time required for a certain percentage of the members of a system to adopt an innovation. Based on innovativeness, the adopters can be classified into five categories.

5.0 Summary

We have been able to identify the four elements of diffusion. These are the innovation, communication channels, time and the social system. The social structure of the system influence how and what information is disseminated.

6.0 Tutor-Marked Assignment

Discuss the elements involved in diffusion.

7.0 References/Further Reading

Ban, A. W. V an den and Hawkins, H. S. Hawkins (1996) *Agricultural Extension*, Blackwell Science, Second edition, 294p

Leeuwis Cees (2003) *Communication for Rural Innovation: Rethinking Agricultural Extension*, CTA, 412p

MANAGE (2007) *Course 102 Communication and Diffusion of Agricultural Innovations* Post Graduate Diploma in Agricultural Extension Management (PGDAEM), Published by National Institute of Agricultural Extension Management, Rajendranagar, India, http://www.manage.gov.in/pgdaem/studymaterial/manage102/manage%20book%20102-block1.pdf

Unit 3

Process of Adoption

Table of Contents:

1.0 Introduction

The decision to adopt an innovation is not normally a single, instantaneous act. It is a decision making process involving a period of time during which an individual goes through a number of mental stages before making a final decision to adopt an innovation. This situation is better explained in terms of stages in adoption and innovation decision process. Technologies/innovation are developed as a result of observed deficiencies in a current way of doing things or emanates from new discoveries about things before innovation. Hence technologies are either completely or partly new and are often expected to replace existing practice. Technologies are meant to be incorporated into farming systems of farmers that is adopted. How this is done is the focus of this unit.

2.0 Objectives

After reading this unit, the student should be able to

- Identify the stages involved in adoption process
- Discuss various stages or steps involved in adoption process

3.0 Main Body

3.1 Process of Adoption

A diffusion of innovation with in a social system takes place through its adoption by individual or groups. Adoption is a decision to make full use of an innovation as the best course of action available. The decision to adopt an innovation, involves a process composed of learning, deciding, and acting over a period of time. The adoption process, as a decision-making process goes through a number of mental stages before making a final decision to adopt an innovation. Decision - making is a process comprising a sequence of stages with a distinct type of activity occurring during each stage. The way in which an individual adopts an innovation is involves the following five steps namely Awareness stage, Interest stage, Evaluation stage, Trial stage and Adoption stage (AIETA).

a) Awareness Stage

This is the starting stage wherein the farmer comes to know the existence of the new idea but he doesn't have full information about the idea. At this stage farmer is aware of the idea, but lacks detailed information about it.

b) Interest Stage

The farmer develops interest in the innovation and seeks additional information about it either from extension officer or from fellow farmers or from any source, which he feels credible. That means the farmer acquires more information about an innovation or idea by wanting to know what the innovation/idea is, how it works and what its potentialities are.

c) **Evaluation Stage**

At the evaluation stage, the farmer makes mental application of the new idea in the present and anticipated future situations and decides whether or not to try it. He judges the utility of the innovation, makes an assessment whether the idea is applicable to own situation and if applied what would be the result.

d) Trial Stage

The farmers may not take up any new idea and an innovation right away on a large scale because he/she doesn't want to take risk even though the potential of the idea has been proved. The new idea is applied on a small scale in order to determine its utility or feasibility and applicability in own situation.

e) Adoption Stages

Being satisfied with the performance of the new idea tested on small scale in his own situation, the farmer uses the new idea continuously on a full scale. Trial may be considered as the practical evaluation of an innovation. The innovation becomes a part of his normal farming

activity. It provides the advantage of the innovation and hence the farmer takes final decision and applies the innovation in a scale appropriate to own situation on a continued basis.

4.0 Conclusion

Adoption of innovation as a process composed of learning, deciding and acting over a period of time. The adoption of a specific practice is not the result of a single decision to act but series of actions and thought decisions.

5.0 Summary

In this unit, we have learnt that adoption of specific practices is not the result of a single decision to act but series of actions and thought decisions.

6.0 Tutor-Marked Assignment

What are the steps involved in the adoption process?

7.0 References/Further Readings

Ban, A. W. Van den and Hawkins, H. S. Hawkins (1996) *Agricultural Extension*, Blackwell Science, Second edition, 294p

Leeuwis, Cees (2003) *Communication for Rural Innovation: Rethinking Agricultural Extension*, CTA, 412p

Unit 4

Diffusion of Innovation

Table of Contents:

1.0 Introduction

Diffusion and adoption are closely interrelated even though they are conceptually distinct. Diffusion of Innovations is a theory that seeks to explain how, why, and at what rate new ideas and technology spread through cultures.

2.0 Objectives

At the end of this unit, the student should be able to:

- Explain the concept of diffusion process of innovation
- Discuss the major stages involved in diffusion of innovation

3.0 Main Body

3.1 Concept of Diffusion of Innovation

Diffusion of Innovations is a theory that seeks to explain how, why, and at what rate new ideas and technology spread through cultures. Everett Rogers, a professor of rural sociology, popularized the theory in his 1962 book *Diffusion of Innovations*. He said diffusion is the process by which an in novation is communicated through certain channels over time among the members of a social system. The origins of the diffusion of innovations theory are varied and span multiple disciplines.

Diffusion of innovations refers to the spread of those innovations through a population, and is simply the result of a host of individual adoption decisions. According to Rogers 1962 the diffusion process can be explained as “the spread of a new idea from its source of invention or creation to its ultimate use of adopters”. The process by which an innovation spreads within a social system is called “diffusion”. An innovation diffuses within a social system through its “adoption” by individual and groups.

An innovation does not diffuse at the same rate. An innovation which represents only a slight modification of an existing idea or practice will obviously diffuse at a faster rate than the one which represents a significant departure from it. The factors that influence diffusion of innovation are a based on the perception of the farmers rather than being inherent qualities of an innovation Perception is an activity through which an individual becomes aware of objects around oneself and of events taking place. Some of the important traits of an innovation which influence the rate of adoption are relative advantage, compatibility, complexity, trial ability and observe ability. These factors shall be discussed in details in unit 7.

Diffusion process is the spread of the message about innovation from its source of invention to the ultimate users in a social system, which may be a village, Ward, Local Government Area or a State. A few highly innovative members of a social system first adopt it. They in turn influence a larger number of individuals. The majority take a long time before accepting the new idea or practice. It is the first few adopters of an innovation who influence the other members of a community to adopt the innovation as they interact with them. This is referred to as the "interaction effect." After the innovation is adopted by a few farmers, they influence a few others to adopt it who, in turn, offers a new stimulus to the remaining ones.

3.2 Stages of Diffusion of Innovation

Diffusion studies have demonstrated a mathematically consistent sigmoid pattern (the S-shaped curve) of adoption for consequential innovations over time when the decisions to adopt are voluntary (Figure 4.1). A predictable pattern over time has been observed when an innovation spreads as the now familiar S-shaped cumulative adoption curve.

According to Dearing (2008) diffusion occurs through a combination of:

- The need for individuals to reduce personal uncertainty when presented with new information,
- The need for individuals to respond to their perceptions of what specific credible others are thinking and doing, and
- General felt social pressure to do as others have done. Uncertainty in response to an innovation typically leads to a search for information and, if the innovation is perceived to be important in terms of having consequences for a potential adopter, a search for evaluative judgments of trusted and respected others.

The diffusion process of an innovation thus involves four major stages.

3.2.1 Innovators

At the first stage, only a few innovative farmers try out and adopt the innovation after its introduction in a village. This group of farmers is often referred to as “innovators” who have been described to be prosperous and venturesome enough to be able to take the risk of trying out an innovative idea or practice.

3.2.2 Early Adopters

In the second stage, a larger group of farmers, but still a small majority in the village is influenced by the innovators to adopt the recommended practice, referred to in the literature as “early adopters”, the group of farmers is not too different from the average farmer, of a village although they are often respected for their farming ability and successful and “discrete” use of new ideas and practices. Because of their respectability in the village, the early adopters serve as the role model for other farmers who seek opinion and advice on farming matters from them.

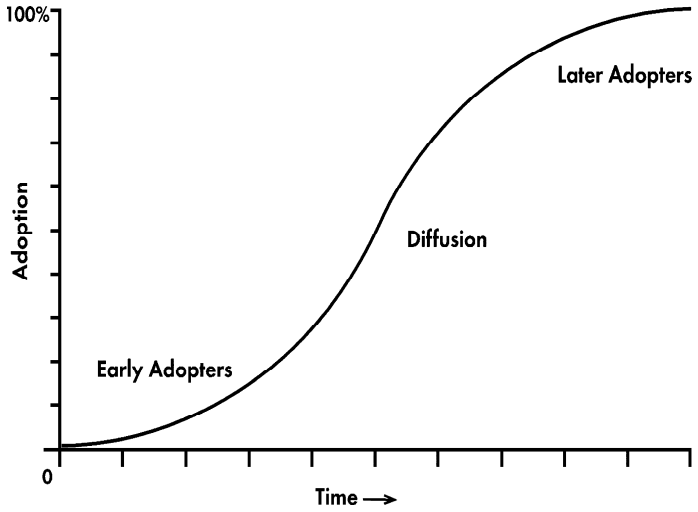


Figure 4.1: S-shaped Cumulative Adoption Curve

3.2.3 Late Adopters

It is primarily this influence of early adopters which makes the large majority of the farmers in a village, called the “late adopters”, to adopt the innovation in the third stage of the diffusion process. This is when the diffusion curve takes a rather steep upward climb. In the final stage, the diffusion process slows down and the diffusion curve gently levels off as the proportionately few remaining farmers of the village gradually adopt the innovation.

3.2.4 Laggards

The small group of farmers who take the longest time to adopt an innovation is called the “laggards”.

4.0 Conclusion

The diffusion process is a social phenomenon by which innovation is communicated through certain channels over time among members of a social system. There is always a variation among the members of a social system in the way they respond to an innovative idea or practice.

5.0 Summary

In this unit, we have discussed the various diffusion process of innovation as a social phenomena and the variation that occurs.

6.0 Tutor-Marked Assignment

Describe the diffusion of innovation process and the various stages involved.

7.0 References/Further Readings

Ban, A. W. Van den and Hawkins, H. S. Hawkins (1996) *Agricultural Extension,* Blackwell Science, Second edition, 294p

Dearing, James W. (2008) Evolution of Diffusion and Dissemination Theory, J Public Health Management Practice, 14(2), 99–108, Copyright, Wolters Kluwer Health/ Lippincott Williams & Wilkins

Leeuwis Cees (2003) *Communication for Rural Innovation: Rethinking Agricultural Extension*, CTA, 412p

MANAGE (2007) *Course 102 Communication and Diffusion of Agricultural Innovations* Post Graduate Diploma in Agricultural Extension Management (PGDAEM), Published by National Institute of Agricultural Extension Management, Rajendranagar, India, http://www.manage.gov.in/pgdaem/studymaterial/manage102/manage%20book%20102-block1.pdf

Rogers, Everett (1962). *Diffusion of innovations*. New York: Free Press

Unit 5

Innovation Models

Table of Contents:

1.0 Introduction

Innovation Diffusion Models

Diffusion is the "process by which an innovation is communicated through certain channels over a period of time among the members of a social system". An innovation is "an idea, practice, or object that is perceived to be new by an individual or other unit of adoption". "Communication is a process in which participants create and share information with one another to reach a mutual understanding" (Rogers, 1995). Models are applied in all situations that require analysis and abstraction from complex phenomena. The objective of such analysis is often to document, understand and enable us to be in a position to influence or alter situations and predict reacts or impact of such

attempts to influence or alter reality. A model therefore is any form of abstraction from reality, aimed at enabling us to understand and deal with particular aspects of reality that is of interest.

2.0 Objective

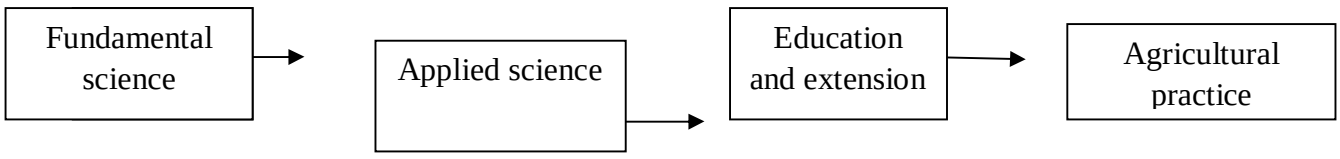
At the end of this unit, you should be able to:

I. Explain the different types of models

3.0 Main Content

3.1 Types of Innovation Models

The **Linear Model of Innovation** is an early model of innovation that suggests technical change happens in a linear fashion from invention to innovation to diffusion. It was basically assumed that innovations originate from scientist, are transferred by communication workers and other intermediaries, and are applied by agricultural practitioners. This model of thinking is called 'the linear model of innovation (Kline and Rosenberg, 1986). The model is further characterised by a clear task division between various actors. Some actors are supposed to specialize in the generation of innovations; others concentrate on their transfer, while the farmers' role is merely to apply the innovations as shown in Figure5.1.



Generation of innovation Transfer of innovations Application of innovations

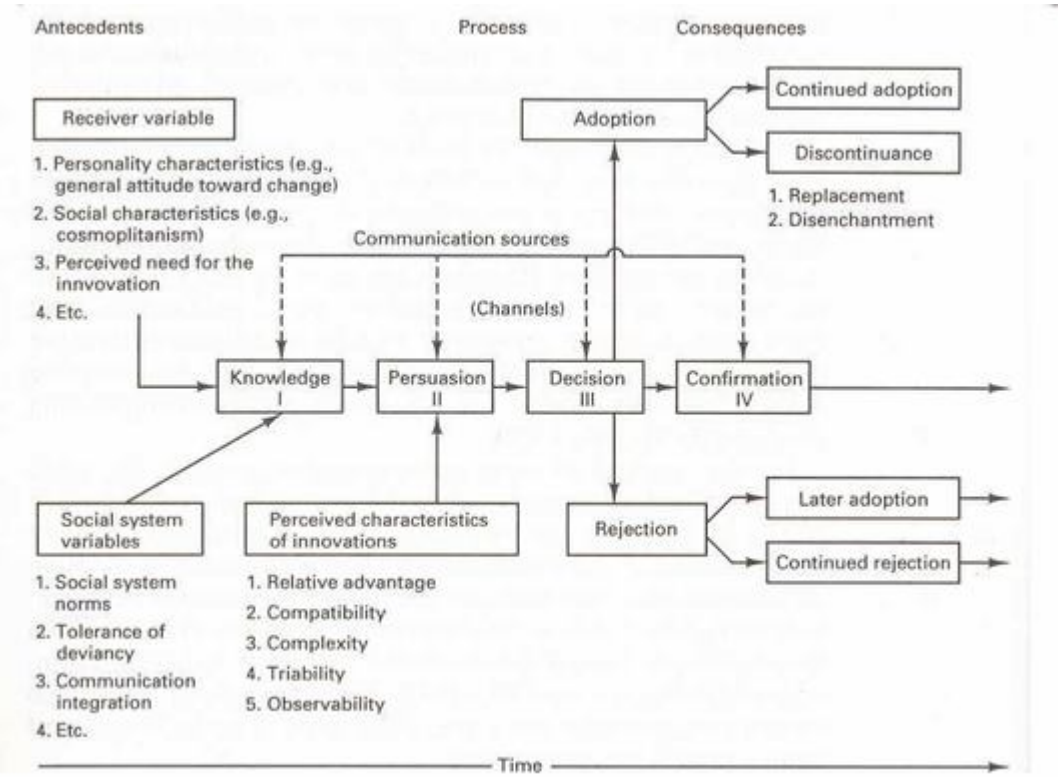
Figure 5.1 The Linear Model of Innovation

However, when scholars started to analyse in retrospect how successful innovations came into practice, hey soon discovered all sorts of deviations from the linear model. It appeared, for example that researchers often got their innovative ideas from practitioners, that farmers made significant adaptations to the packages developed by scientist. Many innovations therefore occurred without involvement of scientists, and the function of communication workers was not so much to transfer knowledge and information from scientists to farmers, but rather the other way round or even to a role only in knowledge exchange among farmers (Leeuwis, 2003). In view of such findings, it was concluded that innovation requires close co-operation in a net-work of actors, who all contribute to the 'generation' and 'transfer' of knowledge, and to its 'integration' into viable innovations. In adoption and diffusion research, the active and creative role of farmers in innovation process has been overlooked. Very few, if any, studies have focused on the adoption of farmers' ideas by researchers and change agents. Apparently, studying adoption 'the other way round' was not considered worthwhile, which is indicative of the limited value attached to farmers' knowledge and ideas by 'adoption and diffusion of innovations' researchers.

Other Models of Innovation are:

1. General vs. Domain specific
2. Conceptual vs. Mathematical

3. Focus on innovation vs. adopters
4. Organizational vs. Individual
5. Process vs. Outcome
6. Proximity vs. Network
7. Rate-oriented vs. Threshold



5.2 Diffusion of innovation model.

Source: Rogers (1995)

4.0 Conclusion

Innovation model is form of abstraction from reality, aimed at assisting us to understand and deal with particular aspects of authenticity that is of concern. Such analysis is often to

document, understand and enable us to be in a position to influence or alter situations and forecast reacts or impact of such attempts to influence or alter reality

5.0 Summary

In this unit, you have learnt about the model of innovation which involves Generation of innovation, transfer of innovations and application of innovations, Diffusion model has three dimensional phases namely; Antecedents, Process and Consequences.

6.0 Tutor-Marked Assignment

Explain the concept of model of diffusion

7.0 References/Further Readings

Kline, S.J. & N. Rosenberg (1986), "An overview of innovation." In R. Landau & N. Rosenberg (eds.), The Positive Sum Strategy: Harnessing Technology for Economic Growth. Washington, D.C.: National Academy Press, pp. 275–305

Leeuwis Cees (2003) Communication for Rural Innovation: Rethinking Agricultural Extension, CTA, 412p

Rogers, E.M. (1995). Diffusion of Innovations (4th ed.). New York: Free Press.

Unit 6

The innovation Decision Process

Table of Contents:

1.0 Introduction

The innovation-decision process is crucial to an innovations being adopted or rejected by an individual, a collective or an authority decision. In this unit we shall identify these stages and their importance in the adoption of an innovation.

2.0 Objectives

By the end of this unit, students should be able to:

- Explain the innovation-decision making
- Discuss the stages of the innovation-decision process

3.0 Main Body

3.1 The innovation Decision Process

The Innovation - Decision process is the process through an individual (or other decision making unit) passes from first knowledge of an innovation, to forming an attitude toward the innovation to a decision to adopt or reject and to implementation of the new idea. This process should be distinguished from the diffusion process by which new ideas are communicated to the members of a social system. The major difference between the two processes is that diffusion occurs among the units in a social system, whereas innovation-decision making takes place within the mind of an individual.

The innovation-decision is a special type of decision-making that involves an individual choosing from a new alternative over those previously in existence. This process is similar to the Adoption process (AIETA) that we studied in unit 3. It consists of a series of actions and choices over time through which an individual or an organization evaluates a new idea and decides whether or not to incorporate the new idea into the ongoing system. Innovation-decision is a process that occurs over time and is conceptualized to have five stages. Rogers came up with a model of Innovation-Decision Process which consists of five stages: knowledge, persuasion, decision, implementation and confirmation (KPDIC).

3.2 Stages of the Innovation-Decision Process

a) Knowledge involves exposure to its existence and understanding of its functions. An early knower generally is more highly educated, has higher social status, is more open to

both mass media and interpersonal channels of communication, and has more contact with change agents. Mass media channels are relatively more important at the knowledge stage, whereas interpersonal channels are relatively more important at the persuasion stage.

b) **Persuasion** entails the forming of a favourable attitude to it. Innovation decisions may be optional (where the person or organisation has a real opportunity to adopt or reject the idea), collective (where a decision is reached by consensus among the members of a system), or authority-based (where a decision is imposed by another person or organisation which possesses requisite power, status or technical expertise).

c) **Decision** stage is a commitment to adoption of the innovation. The individual engages in activities which lead to a choice to adopt or reject the innovation. Actually the entire innovation-decision process is a series of choices at each function. For instance, in the knowledge function the individual must decide which innovation messages to attend to and which ones to disregard. In the persuasion function he must decide to seek certain messages and to ignore others. But in the decision function the type of choice is different from those previous; it is a decision between two alternatives, to adopt or reject a new idea. This decision involves an immediate consideration of whether or not to try the innovation, if it is trial able. Most farmers will not adopt an innovation without trying it first on a probationary basis to determine its utility in their own situation. The small-scale trial is often part of the decision to adopt, and is important as a means to decrease the perceived risk of the innovation for the adopter. In some cases innovation cannot be divided for trial, and so it must be adopted or rejected. Innovations, which can be divided

for trial use, are generally adopted more rapidly. Most farmers who try an innovation then move to an adoption decision, if the innovation has a certain degree of relative advantage.

d) Implementation occurs when an individual or other decision making unit puts an innovation into use. At this stage the individual is generally concerned with where to get the innovation, how to use it and what operational problems will be faced and how these could be solved. Implementation may involve changes in management of the enterprise and/or modification in the innovation, to suit more closely to the specific needs of the particular person who adopts it. Re-invention often occurs at the implementation stage. Re-invention is defined as the degree to which an innovation is changed or modified by a user in the process of its adoption and implementation. Re-invention often is beneficial to the adopters of an innovation. Flexibility in the process of adopting an innovation may reduce mistakes and encourage customization of the innovation to fit it more appropriately to local situations or changing conditions. As a result of re-invention, an innovation may be more appropriate in matching an adopter's preexisting problems and more responsive to new problems that arise during the innovation-decision process.

Recognition of the existence of re-invention brings into focus a different view of adoption behaviour – instead of simply accepting or rejecting an innovation as a fixed idea, potential adopters on many occasions are active participants in the adoption and diffusion process, to give their own unique meaning to the innovation as it is applied in their local context. Adoption of an innovation is thus a process of social construction.

e) Confirmation is the stage of reinforcement based on positive outcomes from the innovation. Most of the researchers indicated that a decision to adopt or reject is not the terminal stage in the innovation-decision process. Human mind is in a dynamic state and

an individual constantly evaluates the situation. If the individual perceives that the innovation is consistently giving satisfactory or unsatisfactory results the person may continue to adopt or reject the innovation as the case may be. At the confirmation function the individual seeks reinforcement for the innovation-decision he has made, but he may reverse his previous decision if exposed to conflicting message about the innovation. The confirmation stage continues for an indefinite period in time.

4.0 Conclusion

Differences exist between the diffusion process and innovation-decision making. The innovation-decision process involves stages and is affected by several factors for a given individual.

5.0 Summary

In this unit, we have identified the differences between diffusion and innovation-decision processes. We have also examined stages involved in the innovation-decision making process.

6.0 Tutor-Marked Assignment

i) Differentiate between the diffusion process and innovation-decision making

ii) List the stages of innovation-decision making process and discuss.

7.0 References/Further Readings

Ban, A. W. Van den and Hawkins, H. S. Hawkins (1996) *Agricultural Extension*, Blackwell Science, Second edition, 294p

Leeuwis Cees (2003) *Communication for Rural Innovation: Rethinking Agricultural Extension*, CTA, 412p

MANAGE (2007) *Course 102 Communication and Diffusion of Agricultural Innovations* Post Graduate Diploma in Agricultural Extension Management (PGDAEM), Published by National Institute of Agricultural Extension Management, Rajendranagar, India, http://www.manage.gov.in/pgdaem/studymaterial/manage102/manage%20book%20102-block1.pdf

Unit 7

Characteristics of Innovation

Table of Contents:

1.0 Introduction

A number of studies have analyzed the relationship between characteristics of innovation in production technology and its rate of adoption. In general, the characteristics listed n this unit are considered as important to innovation.

2.0 Objectives

At the end of this unit, the students should be able to:

- Identify the characteristics of innovation
- Discuss the characteristics of innovation

3.0 Main Body

3.1 Identification/Listing of Characterizing of Adoption

On Characteristics Rogers (1995) identified in each category of adopters are as follows: the Early Adopters: (1) integrated part of the local social system, (2) greatest degree of opinion leadership in most systems, (3) serve as role model for other members or society, (4) respected by peers, and (5) successful; the Early Majority: (1) interact frequently with peers, (2) seldom hold positions of opinion leadership, (3) one-third of the members of a system, making the early majority the largest category, (4) deliberate before adopting a new idea; the Late Majority: (1) one-third of the members of a system, (2) pressure from peers, (3) economic necessity, (4) skeptical, and (5) cautious; the Laggards: (1) possess no opinion leadership, (2) isolates, (3) point of reference in the past, (4) suspicious of innovations, (5) innovation-decision process is lengthy, and (6) resources are limited

3.2 Characteristics of Innovation

For any innovation to be adopted, it must have one or more of the following characteristics or attributes that is perceived by the potential adopter for it to be adopted. Rogers identifies seven critical attributes that greatly influence the rate of adoption:

i) **Relative Advantage –** The innovation must be perceived to be better than the status quo. This will result in expanding the number or geographic reach of users for an existing application. There must also be improved application performance and saving cost to the application supplier or its users.

Many of the performance and cost advantages of an innovation are justified as problem avoidance. Interestingly, Rogers points out that preventative innovations that are justified by avoiding a problem (e.g., not contracting AIDS by adopting "safe sex") are particularly slow in adoption because individuals have difficulties in perceiving the relative advantage.

ii) **Compatibility** is the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters. This is an area where Rogers shows how strongly the adoption process is governed by individuals operating within a social structure. First, the new thing must be technically compatible. Second, the new product or service needs to be organizationally compatible. The culture change required will create resistance to the innovation.

iii) **Complexity** is the degree to which an innovation is perceived as difficult to understand and use. The early adopters were comfortable with their understanding of the new technologies. Today, as described above, the relative advantage of many new technologies is improved performance or reduced cost. Interestingly, the actual complexity of the new devices is much higher.

iv) **Trialability** is the degree to which an innovation can be experimented with a limited basis. There is good news in this area. Many performance techniques can be applied to a very narrow subset of users, locations, applications, and even portions of an application or content. The effect can be monitored to support decisions for gradual expansion of the innovation.

v) **Observability** is the degree to which the results of an innovation are visible to others. As we move to innovations with more subtle performance and cost improvements, measuring the change may be difficult. The more general benefits statements offered by the vendor earlier in the process are not sufficient at this stage. The longer it takes to make the case for an innovation, the longer it will take to be adopted even in an enterprise that is already trying it.

vi) **Divisibility-**This is the degree to which an innovation may be experimented with small units. Purchase of tractors or harvesters and use is a onetime major investment. Part of it cannot be purchased and tried in phases though they could be hired.

vii) **Accessibility-**This is the degree to which an innovation is readily available with minimum effort. There is little need for change agent to push farming inputs that farmers either cannot afford or for which infrastructure does not exist for its distribution.

4.0 Conclusion

One likely problem with measuring the five attributes of innovations is that they may not in all cases be the seven most important perceived characteristics for a particular set of respondents. The solution is to elicit the main attributes of innovations from the respondents as a prior step to measuring these attributes as predictors of the rate of adoption.

5.0 Summary

In this unit, we have studied the characteristics of innovation and how they influence the adoption process.

6.0 Tutor-Marked Assignment

i) Identify the characteristics of adoption.

ii) Enumerate the characteristics of innovations that can enhance adoption.

7.0 References/Further Readings

Ban, A. W. Van den and Hawkins, H. S. Hawkins (1996) *Agricultural Extension*, Blackwell Science, Second edition, 294p

Leeuwis Cees (2003) *Communication for Rural Innovation: Rethinking Agricultural Extension*, CTA, 412p

Unit 8

Factors Determining the Rates of Adoption

Table of Contents:

1.0 Introduction

An important concern in the adoption and diffusion research tradition was to explain and predict the eventual rate of adoption of particular innovation. Rogers (1983) has summarized conclusions in connection with the model that shall be discussed in this unit.

2.0 Objectives

By the end of this unit, students should be able to:

- Explain the concept of adoption rates
- Discuss the factors determining the adoption rates

3.0 Main Body

3.1 Adoption Rates

The rate of adoption is defined as the relative speed with which members of a social system adopt an innovation. It is usually measured by the length of time required for a certain percentage of the members of a social system to adopt an innovation. It also means the number of members of a society who start using a new technology or innovation during a specific period of time. The rate of adoption is a relative measure, meaning that the rate of one group is compared to the adoption of another, often of the entire society.

The rates of adoption for innovations are determined by an individual's adopter category. It is generally measured as the number of individuals who adopt a new idea in a specified period, such as each year. So the rate of adoption is a numerical indicator of the steepness of the adoption curve for an innovation. The more persons are involved in making an innovation-decision, the slower the rate of adoption. If persons perceive situations as real, they are real in their consequences. The variables determining adoption rate according to Rogers (1995) are as follows:

3.2 Variables Determining the Rate of Adoption

A. Perceived characteristics of innovations accounts for 49% to 87% of variance in the rate of adoption. These five attributes have been discussed in details in the previous unit.

1. Relative advantage

a. The degree to which an innovation is perceived as being better than the idea it supersedes.

   i) Cost

   ii) Status aspect – evidence based practices

   iii) Over-adoption – the adoption of an innovation by an individual when experts feel that s/he should reject it.

b. **Generalization–** The relative advantage of an innovation, as perceived by members of a social system, is positively related to its rate of adoption.

c. Preventive Interventions

   i) A preventive innovation has a particularly slow rate of adoption because individuals have difficulties in perceiving its relative advantage. Relative advantage of a preventive innovation is highly uncertain

d. **Communication campaign**.

   i) Intends to generation specific effects on the part of a relatively large number of individuals within a specified period of time and through an organized set of communication activities.

i. Formative research – on going tested on intended audience to make sure the campaign in order to improve effectiveness.

2. Compatibility

a) The degree to which an innovation is perceived as consistent with the exiting values, past experiences, and needs of potential adopters

b) Compatibility with values and beliefs

c) An innovation may be compatible with deeply embedded cultural values but also with previously adopted ideas

d) The more compatible an innovation with norms and values, the less change in behavior it represents

e) Innovation negativism – the degree to which an innovation's failure conditions a potential adopter to reject future innovations.

f) Compatibility with needs

g) Change agents seek to determine the needs of their clients, and then to recommend innovations that fulfill these needs. Empathy is required.

h) Compatibility with rate of adoption

i) Technology cluster

ii) Naming an innovation.

- Selection of a name is a delicate and important matter. Words are the thought-units that structure perceptions.

iii) Positioning an innovation –

i. An individual will behave toward a new idea in a similar manner to the way the individual behaves toward other ideas that are perceived as similar to the new idea.

ii. Positioning research can help identify the ideal niche for an innovation relative to perceptions of existing ideas in the same category.

iv) Indigenous knowledge systems

iii. Changes sometimes forget that almost every innovation is evaluated by clients in terms of their prior experience with something similar.

3. Complexity

i) The degree to which an innovation is perceived as relatively difficult to understand and use.

ii) The more complex an innovation is perceived, the slower the rate of adoption

4. Trialability

i) The degree to which an innovation may be experimented with on a limited basis

ii) The more trialable, the greater the rate of adoption

5. Observability

i) The degree to which the results of an innovation are visible to others

ii) Observability is positively related to the rate of adoption

B. Type of Innovation-Decision- refers to the number of people involved in the adoption process:

a) Optional innovation decisions taken by individuals independent of others, independent of the decisions of other members of the system.

b) Collective innovation decision require consensus among many people in a system or organization, allegedly causing adoption to be slower. The choices could be to adopt or reject an innovation. All units of the system must conform to the system's decision once it is made.

c) Authority innovation decisions involve only a few relatively powerful individuals who possess power, status, or technical expertise can decide on adoption or rejection by a collective decision. Collective and authority decision types are much more common than optional. Authority decisions have the fastest rate of adoption, but can be circumvented during their implementation.

d) Contingent innovation decision type is the fourth type in which choices to adopt or reject can be made only after a prior innovation – decision. For example, an individual member of a social system may be free to adopt or not to adopt a new idea only after his/her system's innovation decision

C. Communication Channels-Mass media channels are relatively more important at the knowledge stage, and interpersonal channels are relatively more important at the persuasion stage in the innovation-decision process. The formation and change of

strongly held attitudes, however, is best accomplished by interpersonal channels. For successful technology transfer programme, the extension agents have to plan their communication strategy based on the actual information needs of the client system. Communication Channel diffusing the innovation at various states in the innovation-decision process are:

a) **Mass media-** Mass media channels are all those means of transmitting messages that involve a mass medium, such as radio, television, newspapers, and so on, which enables a source to reach an audience of many.

b) **Interpersonal**-Interpersonal channels involve a face-to-face exchange between two or more individuals. Localite sources of information belong to the same social system as that of the receivers. Their knowledge about objects and events are restricted, generally confined to the local system. Examples are relatives, friends, neighbours etc. On the other hand, cosmopolite sources of information are from outside the social system of the receivers. Their knowledge about objects and events are wider, and as such, they can bring new ideas to the receivers. Examples are extension agents (personal cosmopolite), mass media (impersonal cosmopolite) etc.

c) **Hybrid Media:** the Internet- New media have emerged that tend to combine the functional properties of mass media and of interpersonal communication. This is because they can potentially reach large numbers of people in many locations, but at the same time support a level of interactivity that is higher than with conventional mass media. Many of the hybrid media are based on technology and often referred to as information and communication technology (ICT). Examples are CD-ROM (Compact Disc-Read Only Memory, electronic conferencing, internet and other social networks.

D. Nature of the Social System-is connected largely with social influence and societal characteristics that shape diffusion:

Knowledge and perception are subject to social influences and related to social interests.

a) Social Norms- people's social background, socio-cultural values and beliefs

b) Pattern of network interconnectedness in social networks- political contexts and group interest, individual; interest in specific interaction settings

E. Extent of Change agent's promotion efforts

Greatest response to change agent effort occurs when opinion leaders adopt, which usually occurs somewhere between 3 and 16 % adoption in most systems. The effort of the change agent in effecting adoption rate will be discussed in more details in unit 10.

4.0 Conclusion

In conclusion, individuals who first adopt an innovation require a shorter adoption period (adoption process) than late adopters. Attributes of an innovation that affect the rate of adoption include the advantage created by adopting the innovation, the ease at which the innovation can be adopted into daily life, the ability of other members of society to see those who have already adopted the innovation and the expense associated with trying the innovation.

5.0 Summary

We have been able to define what adoption rate is. In this unit we have also indentified the factors that determine the rate of adoption.

6.0 Tutor-Marked Assignment

i. Define adoption rate.

ii. Enumerate the factors determining adoption rate and explain

7.0 Further Readings

Ban, A. W. Van den and Hawkins, H. S. Hawkins (1996) *Agricultural Extension*, Blackwell Science, Second edition, 294p

Leeuwis Cees (2003) *Communication for Rural Innovation: Rethinking Agricultural Extension*, CTA, 412p

Unit 9

Adopter Categories

Table of Contents:

1.0 Introduction

Innovations are not adopted by everyone at the same time. Specific innovations are used more quickly by some and taken up later by others, while others in the society never adopt them. Adoption research suggested that there was a pattern in the rate at which people adopted innovations. It is inferred that some adopt early, while others will adopt late. An adoption index was usually calculated by asking people if they have adopted any of the 10 to 15 innovations recommended by the local extension service. Individuals would receive a point for each adopted. On the basis of their scores, adoption researchers classified people into five different categories.

2.0 Objectives

At the end of this unit you will be able to:

- Discuss different types of people in every community based on their reaction to changes
- Differentiate between concepts pertaining to adoption among people
- Explain the characteristics of different adopters categories

3.0 Main Body

3.1 Concepts Pertaining to Adoption among People

It is necessary to clarify certain concepts pertaining to adoption among people. These include adoption rate, speed of adoption and innovativeness.

3.1.1 Adoption Rate The rate of adoption is the third area in the diffusion of innovations that involves time (Rogers, 1995). Adoption of innovations is slow and gradual at the start. This is evident with media literacy. Many teachers and administrators have been reluctant to adopt media literacy. However, there is a change in the climate and more and more schools are accepting media literacy as an integral part of the educational process. The adoption of media literacy is growing rapidly, which is consistent with the rate of adoption theory. The rapid growth will taper off eventually and decline slightly. The cumulative frequency distribution over time will resemble a s-shaped curve (Rogers, 1995). As more individuals perceive media literacy training to possess greater relative advantage and compatibility, and the like, the rate of adoption will likely increase

3.1.2 Speed of Adoption. The speed is usually measured by the length of time required for a certain percentage of the members of a social system to adopt an innovation. It also means the number of members of a society who start using a new technology or innovation during a specific period of time. The rate of adoption is a relative measure, meaning that the rate of one group is compared to the adoption of another, often of the entire society

3.1.3 Innovativeness. This is the degree to which an individual or other unit of adoption is relatively earlier in adopting new ideas than other members of a social system

3.2 Adoption Categories

There are five adopter categories, or classifications of the members of a social system on the basis on their innovativeness as shown in Figure 8.1. The categories are as follows:

a) Innovators are the first 2.5% of the individuals in a social system to adopt an innovation. This interest in new ideas leads them out of a local circle of peer networks and into more cosmopolite social relationships. Communication patterns and friendships among a clique of innovators are common, even though the geographical distance between the innovators may be considerable. Being an innovator has several prerequisites. Control of substantial financial resources is helpful to absorb the possible loss from an unprofitable innovation. The ability to understand and apply complex technical knowledge is also needed. The innovator must be able to cope with a high degree of uncertainty about an innovation at the time of adoption. Though an innovator may not be respected by the other members of a social system, the innovator plays an important role in the diffusion process.

b) **Early adopters** are the next 13.5% of the individuals in a system to adopt an innovation. Early adopters are a more integrated part of the local system than are innovators. Whereas innovators have urban contacts (cosmopolitanism), early adopters live within the local communities. This adopter category, more than any other, has the greatest degree of opinion leadership in most systems. Potential adopters look to early adopters for advice and information about the innovation. This adopter category is generally sought by change agents as a local missionary for speeding the diffusion process. Because early adopters are not too far ahead of the average individual in innovativeness, they serve as a role-model for many other members of a social system. The early adopter is respected by his or her peers and is the embodiment of successful, discrete use of new ideas. The early adopter knows that to continue to earn this esteem of colleagues and to maintain a central position in the communication networks of the system; he or she must make judicious innovation-decisions. The early adopter decreases uncertainty about a new idea by adopting it, and then conveying a subjective evaluation of the innovation to near-peers through interpersonal networks.

c) **Early majority** is the next 34% of the individuals in a system to adopt an innovation. The early majority adopt new ideas just before the average member of a system. The early majority interacts frequently with their peers, but seldom holds positions of opinion leadership in a system. The early majority's unique position between the very early and the relatively late to adopt, makes them an important link in the diffusion

process. They provide interconnectedness in the system's interpersonal networks. The early majority are one of the two most numerous adopter categories, making up one third of the members of a system. The early majority may deliberate for some time before completely adopting a new idea. They follow with deliberate willingness in adopting innovations, but seldom lead.

d) **Late majority** is the next 34% of the individuals in a system to adopt an innovation. The late majority adopt new ideas just after the average member of a system. Like the early majority, the late majority make up one-third of the members of a system. Adoption may be the result of increasing network pressures from peers. Innovations are approached with a skeptical and cautious air, and the late majority do not adopt until most others in their system have done so. The weight of system norms must definitely favor an innovation before the late majority is convinced. The pressure of peers is necessary to motivate adoption. Their relatively scarce resources mean that most of the uncertainty about a new idea must be removed before the late majority feel that it is safe to adopt. The late majority are not oriented to their social system. They are isolates, traditional bound and do not encourage any adoption. Their participation in community social systems or organizations and activities is very low. They are low in their education, change agent contact and media exposures.

e) **Laggards** are the last 16% of the individuals in a system to adopt an innovation. They possess almost no opinion leadership. Laggards are the most traditional minded of all adopter categories; many are near isolated in the social networks of their

system. Similar to the late majority, the laggards' participation in community social systems or organizations and activities is very low. They are low in their education, change agent contact and media exposures. The point of reference for the laggard is the past. Decisions are often made in terms of what has been done previously. Laggards tend to be suspicious of innovations and change agents. Resistance to innovations on the part of laggards may be entirely rational from the laggard's viewpoint, as their resources are limited and they must be certain that a new idea will not fail before they can adopt. They are the last to adopt or may never adopt the innovation.

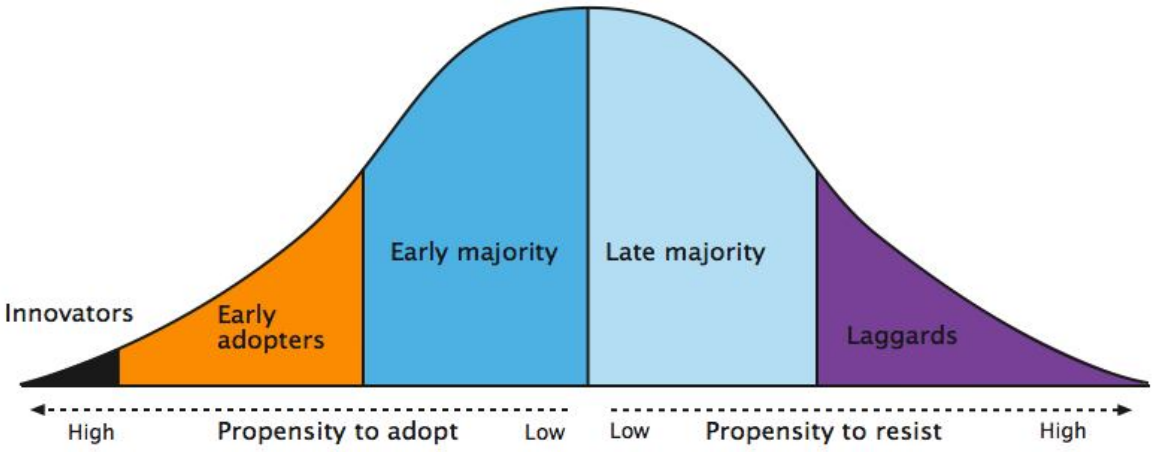


Figure 8.1: Categorization of Adopters of Innovation

4.0 Conclusion

The willingness to adopt an innovation varies among people in a given society. Certain social characteristics have been observed to influence why some individuals adopt innovation early, while others are delay.

5.0 Summary

In this unit, the adopters of innovation have been classified. Under each category, we have identified the characteristics and how they enhance adoption of innovation.

6.0 Tutor-Marked Assignment

Describe the categories of adopters of innovators and highlight their characteristics.

7.0 References/Further Readings

Ban, A. W. Van den and Hawkins, H. S. Hawkins (1996) *Agricultural Extension*, Blackwell Science, Second edition, 294p

Leeuwis Cees (2003) *Communication for Rural Innovation: Rethinking Agricultural Extension*, CTA, 412p

Unit 10

Opinion Leadership

Table of Contents:

1.0 Introduction

Key aspect of understanding how the social system affects diffusion is that social systems have prestige hierarchies. This is because some persons/organizations are more influential than others. The social comparison process is affected most by opinion leaders. To effectively gain adoption of a new technology, the change agent should know how to identify opinion leaders in the social system. In this unit we shall discuss the role of the opinion leader in adoption of innovation.

2.0 Objectives

At the end of this unit, we shall be able to:

- Explain the concept of opinion leaders
- Characteristics of opinion leaders
- Role of opinion leaders in adoption of innovation
- Measure the opinion leadership of individuals.

3.0 Main Body

3.1 Opinion Leaders

Opinion leaders are informal leaders that are able to influence others. This informal leadership is not a function of the individual's final position or status in the system, but is earned and maintained by individuals' technical competence, social accessibility, and conformity to the system's norms. By their close conformity to the system's norms, opinion leaders serve as an opt model for the innovation behaviours of their followers. Opinion leaders have more exposure to external communication, higher social status greater mass media exposure, greater change agent contact, greater social participation, more urban contact and innovativeness. Opinion leaders are individuals who receive information from the media and pass it along to their peers. They are individuals who are knowledgeable about various topics and whose advice is taken seriously by others. The opinion leader is the agent who is an active media user and who interprets the meaning of media messages or content for lower-end media users.

Typically the opinion leader is held in high esteem by those who accept his or her opinions. Opinion leadership tends to be subject specific, that is, a person that is an opinion leader in one field may be a follower in another field. An example of an opinion leader in the field of computer technology might be a neighborhood computer service technician. The technician has access to far more information on this topic than the average consumer and has the requisite background to understand the information, though the same person might be a follower at another field (for example sports) and ask others for advice. Opinion leaders are seen to have more influence than the media for a number of reasons. Opinion leaders are seen as trustworthy and non-purposive. People do not feel they are being tricked into thinking a certain way about something from someone they know. However, the media can be seen as forcing a concept on the public and therefore less influential. While the media can act as a reinforcing agent, opinion leaders have a more changing or determining role in an individual's opinion or action.

Opinion leaders can be found in all types of groups: occupational, social, community, and others. They often tend to be very socially active and highly interconnected within the community. Effective opinion leaders tend to be slightly higher than the people they influence in terms of status and educational attainment, but not so high as to be in a different social class. This way, the leaders are still a part of their audience's reference group. It is important to remember, that social power, educational attainment, and public are not absolute requirements for opinion leadership. Despite the existence of opinion leaders, it is not always easy to distinguish them from the other members of groups. This is

because opinion leadership is not a trait, but rather a role taken by some individuals under certain circumstances. In other words, anyone can be an opinion leader at any given time. Such leadership changes from time to time and from issue to issue. Opinion leaders also play important roles in movements of social change and can bring legitimacy to a social movement. This is because they tend to be similar to those they influence based on personality, interests, demographics, or socio-economic factors. These leaders tend to influence others to change their attitudes and behaviors.

3.2 Characteristics of Opinion Leaders

1. External Communication-Opinion leaders have greater exposure to mass media than their followers
2. Accessibility-They are socially accessible and have greater social participation than their followers.
3. Socio-economic Status-They usually have higher socio-economic status than their followers
4. Innovativeness-If opinion leaders are to accepted by their peers, as competent and trust worthy, they should adopt new ideas before their followers. Hence they are more innovative than their followers.
5. They conform to system norms-Opinion leaders conform to the societal norm of their system.

3.3 Measurement of Opinion Leadership

There are four approaches to identifying opinion leaders: sociometric methods, key-informant methods, self-designating methods, and observation .

1. **Socio-metric method**: The word *sociometry* comes from the Latin "socius," meaning social and the Latin "metrum," meaning measure. As these roots imply, sociometry is a way of measuring the degree of relatedness among people. Measurement of relatedness can be useful not only in the assessment of behavior within groups, but also for interventions to bring about positive change and for determining the extent of change. For a work group, sociometry can be a powerful tool for reducing conflict and improving communication because it allows the group to see itself objectively and to analyze its own dynamics. It is also a powerful tool for assessing dynamics and development in groups devoted to therapy or training.sociometry is a methodology for tracking the energy vectors of interpersonal relationships in a group. It shows the patterns of how individuals associate with each other when acting as a group toward a specified end or goal (Criswell in Moreno, 1960, p. 140). Moreno himself defined sociometry as "the mathematical study of psychological properties of populations, the experimental technique of and the results obtained by application of quantitative methods" (Moreno, 1953, pp. 15-16).

   Sociometry is based on the fact that people make choices in interpersonal relationships. Whenever people gather, they make choices--where to sit or stand; choices about who is perceived as friendly and who not, who is central to the group, who is rejected, who is

isolated. As Moreno says, “Choices are fundamental facts in all ongoing human relations, choices of people and choices of things. It is immaterial whether the motivations are known to the chooser or not; it is immaterial whether [the choices] are inarticulate or highly expressive, whether rational or irrational. They do not require any special justification as long as they are spontaneous and true to the self of the chooser. They are facts of the first existential order.” (Moreno, 1953, p. 720). *Sociometric*: As noted by Rogers, opinion leaders typically are located at the center of communication networks. Sociometry is the mapping, usually using sophisticated network analysis software, of contacts among a potential list of opinion leaders (usually those identified by the reputational approach). This mapping of contacts helps the change agent locate persons who are at the center of communications about the issue area. A question asked of reputational leaders to map contacts might be, "How often do you contact [person X] about school-related issues in this community?"

One interesting use of sociometric analysis is the identification of cliques of leaders. Personal histories or acquired characteristics such as skin color or gender can underlie the formation of leadership cliques in a community. Sociometric maps can help identify "natural" boundaries among cliques of opinion leaders. Sociometric maps also can help identify interstitial persons, who link leadership cliques. Interstitial persons might be somewhat marginal to their respective cliques, but because they are connected with other cliques, they can provide the change agent with access to cliques that might otherwise be difficult for the change agent to gain rapport. Interstitial persons might have a "weak" tie to one another (i.e., they might not contact one another very often). But the strength" of this weak tie is it gives the change agent access to different cliques of opinion leaders.

The typical process for a sociometric intervention in an organization follows these basic steps: (1) Identify the group to be studied, (2) Develop the criterion, (3) Establish rapport / warm-up, (4) Gather sociometric data, (5) Analyze and interpret data, (6) Feed back data, either: (a) to individuals, prior to group meeting, or (b) in a group setting, (7) Develop and implement action plans, (8) Post-test (optional).

2. **Key informant rating.** The key informant method is based on obtaining information, over time, from a community resident who is in a position to know the community well. The person or persons selected to be key informants must therefore have a broad knowledge of the community, its services, and its people. It is an excellent way to recover information about past events or ways of life that are no longer observable

   The process involves:

   1) Collect qualitative, in-depth information from a wide range of people
   2) Collect information about a pressing issue or problem in the community
   3) Understand beliefs and motivations
   4) Understand sensitive topics and
   5) Get the story behind a participant's experiences

3. ***Self-Designating*:** Here, the change agent asks selected individuals to identify themselves as being influential on school-related issues. The approach has the advantage of getting input on influence from community members, and therefore is more accurate than the positional approach. It requires a bit more expense in that the change agent typically will

travel to the community to interview persons for the needed information. A potential pitfall of the self-designating approach is that persons might over- or under-estimate their influence on others. Self-designated techniques are achieved by someone who has perceived self-efficacy. This allows people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives. Such beliefs produce these diverse effects through four major processes. They include cognitive, motivational, affective and selection processes. A strong sense of efficacy enhances human accomplishment and personal well-being in many ways. People with high assurance in their capabilities approach difficult tasks as challenges to be mastered rather than as threats to be avoided. Such an efficacious outlook fosters intrinsic interest and deep engrossment in activities. They set themselves challenging goals and maintain strong commitment to them. They heighten and sustain their efforts in the face of failure. They quickly recover their sense of efficacy after failures or setbacks. They attribute failure to insufficient effort or deficient knowledge and skills which are acquirable. They approach threatening situations with assurance that they can exercise control over them. Such an efficacious outlook produces personal accomplishments, reduces stress and lowers vulnerability to depression.

4. **Through *Observation*:** There is no substitute for observing social action within the community. Some opinion leaders are not located at the center of a communication network, but prefer by their personality to be located a bit outside the everyday communication pattern. Also, reputation can be misleading. If the sociometric analysis is conducted using reputational leaders, an important leader might have been left off of the

map altogether. Observation, because of costs related to lodging, food, and travel, is the most expensive of the techniques described here, but it is also the most accurate

4.0 Conclusion

Throughout the diffusion process there is evidence that not all individuals exert an equal amount of influence over all individuals. There are Opinion Leaders, who are influential in spreading either positive or negative information about an innovation.

5.0 Summary

We have defined and described characteristics of opinion leaders. The defining characteristic of opinion leaders is that they are well respected in their social system.

6.0 Tutor-Marked Assignment

- Who are Opinion Leaders?
- Discuss their characteristics and role in the diffusion and adoption of innovation

7.0 References/Further Readings

Ban, A. W. Van den and Hawkins, H. S. Hawkins (1996) *Agricultural Extension*, Blackwell Science, Second edition, 294p

Leeuwis Cees (2003) *Communication for Rural Innovation: Rethinking Agricultural Extension*, CTA, 412p

MANAGE (2007) *Course 102 Communication and Diffusion of Agricultural Innovations* Post Graduate Diploma in Agricultural Extension Management (PGDAEM), Published by National Institute of Agricultural Extension Management, Rajendranagar, India,

Moreno, Jacob Levy (1934, Revised edition 1953). *Who Shall Survive?* Beacon, NY: Beacon House.

Moreno, Jacob Levy (1960). *The Sociometry Reader*. Glencoe, Illinois: The Free Press.

http://www.manage.gov.in/pgdaem/studymaterial/manage102/manage%20book%20102-block1.pdf

Unit 11

Change Agents

Table of Contents:

1.0 Introduction

In the social systems there are change agents that play important roles in the innovation process. The change agents are known to positively influence innovation decisions, by mediating between the change agency and the relevant social system. Change agents are individuals who influence change in attitudes, knowledge and skills of their clientele in direction that will ensure their adoption of innovations. They are in position to develop the need for change and to help clientele to translate the intent into action.

2.0 Objectives

At the end of this unit, the student should be able to:

- Define change agents
- Function of change agents in adoption of innovation
- Characteristics and reason for the change agents

3.0 Main Content

3.1 Change Agents

The social system includes several players such as the change agent. A change agent is an individual who influences clients' innovation decisions in a desired direction. As members of the social system who have early knowledge of an innovation, they can educate clients about how it can be adopted to reduce uncertainty in the cause-effect relationships involved in achieving a desired outcome.

The change agent usually seeks to ensure the adoption of new ideas, but may also attempt to slow down diffusion and prevent the adoption of undesirable innovations.

Change agents are known to use opinion leaders in diffusion campaigns. Change agents usually introduce innovations into a client system that they expect changes which can be desirable, direct and anticipated, but often some innovations result in some unanticipated consequences that are indirect and undesirable for the systems members. Change agents can predict an innovation's form and perhaps its function but not its meaning for the client.

Change aides complement the change agent, by having more intensive contact with clients, and who have less competence credibility but more safety or trustworthiness credibility).

3.2 Functions of Change Agents.

The change agent functions are to:

- develop a need for change on the part of the client;
- establish an information-exchange relationship;
- diagnose the client problems;
- create intent to change in the client;
- translate this intent into action;
- stabilize adoption and prevent discontinuance; and
- shift the client from reliance on the change agent to self-reliance.

3.3 Characteristics and reason for the change agents

Change is no single event, it takes time to plan for change for change, try new practices and incorporate new programs effectively. Change is a process, which progress ones a period of time. Whilst change itself always carries with it improbability, the process of change should be managed by an effective plan, unambiguous rules, processes, protocol and system. Educational researchers have defined change agent for organizations and individuals as :

(i) Change can energize, act as a catalyst.

(ii) Build a sense of community.

(iii) Process of change may not be embraced by all.

(iv) Conflicts are a natural part of the change process.

(v) Involvement in the change process is individualistic and ultimately the responsibility of each person within the organisation, (vi) When individuals have clearly defined goals and expectations along with an understanding that the change can be effective, success and more acceptance of the

change process can occur.

Reasons for the change agent:

(i) Technological Advanchement the new technologies basically CRM, e-business and knowledge management technology is now considered as a strategic tools, an automation tool in the past. This necessitates upgrading of the existing skill sets of employees change as well. The advancement in the information Agricultural technology requires organisations to.

(ii) Be able to develop an IT strategy that fully supports and enables the business strategy to develop and grow.

(iii) Listen to business needs and traslate them into technology requirements.

(iv) Make the common database availabel to all in customer service management.

(v) Use easy access to a knowledge management approach and technology to turn individual knowledge into comnpany wide knowledge speedily and effectively.

The process to manage the change :

Implementation of the above processes bring large scale organisational changes which must be managed properly employees must strive to appraise the situation so as to identity major barriers and evolve strategies to deal with the new situation. Implementing the change process is as immense as the challenge of creating innovative business process solutions but change brings

destruction as wel. Incorporation of both these hard and soft skills will help to win widespread support for process changes and methodologies to execute the solution effectively.

As a change agent in Agricultural organization there should be: (i) Sensitivity Training : Sensitivity Training refers to a method of changing behavior through unstructured group interface T-groups aim at the following :

• Understanding one's own behaviour and how one's behaviour affets others

• Understanding why people behave the way they do.

• Encouraging on to try out new ways of interacting with people and receiving feedback.

• Understanding group processes.

• Developing tolerance for other people's behaviour.

4.0 Conclusion

Change agents are influential in enhancing adoption of an innovation. They work together with opinion leaders and change aides to achieve this. Though change agents can anticipate an innovation’s usefulness, but they may not be able to foresee its meaning for the clients.

5.0 Summary

We have defined and described characteristics of change agents. The defining characteristic of opinion leaders is that they are well respected in their social system.

6.0 Tutor-Marked Assignment

- Who are change agents?
- Discuss their characteristics and role in the diffusion and adoption of innovation

7.0 Further Readings

Ban, A. W. Van den and Hawkins, H. S. Hawkins (1996) *Agricultural Extension*, Blackwell Science, Second edition, 294p

Leeuwis Cees (2003) *Communication for Rural Innovation: Rethinking Agricultural Extension*, CTA, 412p

Unit 12

Theoretical Formulations on the Diffusion of Innovations

Table of Contents:

1.0 Introduction

The theory of innovation diffusion may be understood as capturing the innovation-decision process, innovation characteristics, adopter characteristics, and opinion leadership. The innovation- decision process represents the framework on which diffusion research is built. It delineates the process through which a decision maker (representing any unit of analysis) chooses to adopt, reinvent (modify), or reject an innovation.

2.0 Objectives

By the end of this unit, students should be able to:

- Examine the formulation of theory on diffusion of innovations
- Discuss the four theories on the diffusion of innovation

3.0 Main Content

3.1 Theoretical Formulations on the Diffusion of Innovations

The theoretical work of Everett Rogers (1995) initially resulted in the collection of knowledge gained from the rural sociology tradition, then facilitated the transition to communication perspectives, and now has served as the mainstay of what is developing as a more cross-disciplinary focus on innovation diffusion. His contribution is twofold:

- He created inventories of findings from many disciplines and from many types of innovation. These inventories provided impetus for the development of a definition of innovation diffusion that was not bound by discipline.
- Rogers assembled and refined theoretical structures aimed at explaining the principal features of innovation diffusion. The theoretical work has cemented a core of knowledge and principles that are widely identified (and used empirically) as the bases of the diffusion of innovations.

Rogers (1995) based on his findings, presented four diffusion theories as follows:

3.2 Theories of Diffusion of Innovation

1. Innovation Decision Process theory-Potential adopters of a technology progress over time through five stages in the diffusion process. In the persuasion stage, the decision maker forms a positive or negative attitude toward the innovation. The third stage, decision, deals with the decision-makers choice to accept or reject the innovation. Implementation, the fourth stage, follows a decision to accept and involves putting the innovation into some use (in either its accepted form or some modified form). During the final stage of confirmation, decision makers assess an adopted innovation, gather information from significant others, and choose to continue to use the innovation as is, modify it (reinvention), or reject it. While some have criticized the stage model as too linear, Rogers (1983) has convincingly argued that existing formulations afford a degree of interpretative and predictive flexibility that averts historical problems with stage models in social science.

2. Individual Innovativeness theory-Individuals who are risk takers or otherwise innovative will adopt an innovation earlier in the continuum of diffusion. Identifying the characteristics of people who adopt innovations raises the question of interpersonal influence. Three issues are addressed in the development of propositions about the role of interpersonal influence in the innovation decision process: information flow, opinion leadership, and diffusion networks. Over time, information flow has been seen as a ‘‘hypodermic needle’’ model, a two-step flow (to opinion leaders, then other adopters),

and a multi-step flow. Currently, information flows are seen as multi-step in nature and are described in terms of homophily and heterophily— the degree to which pairs of interacting potential adopters is similar or dissimilar. Opinion leadership denotes the degree to which one member of a social system can influence the attitude and behavior of others. This concept is presently discussed relative to spheres of influence, wherein a given person may be a leader or follower depending upon the part of the diffusion network being referenced. The diffusion or communication network is the structural stage upon which social influence takes place.

3. **Rate of Adoption theory-**Diffusion takes place over time with innovations going through a slow, gradual growth period, followed by dramatic and rapid growth, then a gradual stabilization and finally a decline. The third component of diffusion of innovation theory addresses adopter characteristics. Adopter categories are classifications of individuals by how readily they adopt an innovation. Rogers (1983) identifies nine socioeconomic variables, twelve personality variables, and ten personal communication characteristics that have been demonstrated to bear upon adoption choices. In general, the literature holds that early adopters are more likely to be characterized by high socioeconomic status, high tolerance of uncertainty and change, low levels of fatalism and dogmatism, high integration into the social system, high exposure to mass media and interpersonal communication channels, and frequent engagement in information seeking.

4. **Perceived Attributes theory-** Different innovations have different probabilities of adoption and hence, different adoption rates. That is, they travel through the innovation

decision process at varying speeds. The literature demonstrates that five characteristics of innovations influence the adoption decision. Compatibility refers to the congruence between an innovation and the prevailing norms, values, and perceived needs of the potential adopter. Higher levels of compatibility are associated with greater likelihood of adoption. Innovation complexity, on the other hand, is negatively associated with adoption. The extent to which use of an innovation is visible to the social group—called observability—is positively related to adoption. Relative advantage refers to the extent to which an innovation is perceived to be ‘‘better’’ than the idea, practice, or element that it replaces. Higher relative advantage increases the probability of adoption. Finally, trialability— the extent to which an innovation may be experimented with—also increases the probability of adoption

4.0 Conclusion

Diffusion of innovation is an area of extension education that has received most support from empirical research. The main theories, which are product of the research relevant to diffusion of innovations, have been discussed. Other theories that are relevant also exist. There is need to ask new questions and study new problems if science must be advanced to solve practical extension problems.

5.0 Summary

In this unit we have examine the role of Everett Rogers in formulation of theory on diffusion of innovations. The four theories on the diffusion of innovation have also been discussed.

6.0 Tutor-Marked Assignment

Describe the contribution of the theoretical work of Everett Rogers to diffusion of innovation.

7.0 References/Further Readings

- Rogers, E. M. (1983). *Diffusion of innovations* (3rd ed.). New York: The Free Press.
- Rogers, E.M. (1995). *Diffusion of innovations* (4th ed.). New York: The Free Press.

Unit 13

Sectors Related to Differential Rates of Adoption of New Agricultural Technology

Table of Contents:

1.0 Introduction

As it has increasingly been applied to agricultural, international development, public health, and educational interventions, classical diffusion of innovation theory is evolving into a science of dissemination.

Agricultural Mechanization embraces the use of tools, implements and machines for agricultural land development, crop production, harvesting, preparation for storage, storage, and on-farm processing. It includes three main power sources: human, animal, and mechanical. The manufacture, distribution, repair, maintenance, management and utilization of agricultural tools,

implements and machines is covered under this discipline with regard as to how to supply mechanization inputs to the farmer in an efficient and effective manner.

2.0 Objectives

At the end of this unit you should be able to

Explain the concept of sectorial Differential Rates of Adoption of New Agricultural Technology

3.0 Main Content

3.1 Differential Rates of Adoption of New Agricultural Technology

The organizational factors that promote and inhibit successful technological implementation and adoption is critical. This enhances existing models of information technology implementation and adoption but tailors to the issues facing the public sector. If public agricultural administrators can find improved methods of implementing and adopting technology, they will be able to fulfill the promise of the link between technology and productivity. By managing these information technology based assets, millions if not billions of dollars will be available to use in other ways.

It is well known that top-down bureaucratic means of transferring technology do work. One factor, other than administrative support, responsible for the diffusion was the suitability and adaptability of the technology over large areas of developing countries. If technology is good and provides spectacular results, some farmers do not lag behind in its adoption and adaptation. Why does the problem arise when this model of technology transfer is used? farmers with small or big access to resources and institutions, have ability (skills) to use new technology and have assurance of future returns from present investments and do not have to worry about others' behavior vis-a-vis one's own, the technological diffusion does not pose much problems.

Price and procurement support besides input subsidies have played in diffusion of technology. The private sector recognized tremendous scope of gains in participating and accelerating technology transfer.

High expenses and poor internal collaboration often sink provider efforts to implement new technology initiatives. Conversely, the 18 case studies in the report identified seven markers of success: a culture that values innovation, good champions, involved board directors, a willingness to outsource, a forward-looking information technology team, a take-charge approach and a commitment to clean up processes.

“These studies offer valuable insights to providers about implementing innovative technology-enabled care models

3.2 Agricultural Technology Adaptation and Appropriateness

Rarely is the same technological solution optimal everywhere. The value of an innovation depends on socio-economic, climatic, and ecological specifics.

Export of technologies across regions without adaptation may lead to negative environmental side effects and waste. A technology may have several versions to meet needs and capabilities of various users in a region, e.g., large vs. small farmers’ versions of a machinery.

Labor shortages led to mechanized equipment; Drought conditions led to improved irrigation Energy crises led to higher efficiency cars. Farmers’ cooperatives were established during periods of excessive low farm prices. Environmental regulations trigger cleaner technologies. A tax on carbon will lead to improved stoves and power plants. Universities and start-up companies are becoming major sources of new innovations. The ownership of a technology and leadership in its applications move between organizations over time. For example:

I. Incentives for Innovations
II. Patents: Awards monopoly rights for 17-20 years.
III. Patent protection allows publication of research findings that leads to innovations.

IV. Patent rights (for certain applications) can be transferred.

V. Patents are valid only where they are registered.

VI. Copyright protection: Pertains to books, brand names, and the media.

VII. Trade secrets: Protects against thefts.

VIII. Plant breeders' right: Allows exclusive sales of varieties and allows farmers to reuse seeds.

IX. Prizes: Awarded to winners of a contest for finding a technical solution to a problem.

X. Indigenous knowledge is poorly protected.

Mechanical Agricultural innovations: Tractors and cars are adopted by larger farms and richer families.

In the case of a tractor,

L = size of farm

a = saving per acre

P = cost of tractor

Adopt if $P > aL$

$L = P/a$ critical size.

Critical size declines because P declines. As a result of learning by doing, a increases as a result of learning by using.

Other Examples

Water-conserving technologies (sprinklers) increase water-use efficiency if:

a. With traditional technology,
b. 50% of applied water is actually consumed.
c. 75% is consumed with sprinklers.
d. It results in higher yield and water saving.

Technology adoption occurs in sandy soils and hills where the traditional technology is especially inefficient, Locations where the price of water is high. With high-value crops. Green Revolution technologies are high-yield varieties that require complementary inputs (fertilizers and sometimes water). They are adopted when:

I. They have high yield and cost effects.
II. Farmers have access to credit.
III. Adoption and Risk
IV. Impacts of technologies are unknown.
V. Risk considerations slow adoption.

One approach in assessing a technology:

I. Maximize Expected benefits-a risk
II. where a is a coefficient of risk aversion.
III. Risk may be measured by a variance of profit.
IV. Policies that reduce risk include
V. insurance (crop insurance enhances adoption)
VI. Diversification.

An alternative approach:

a. Select the technology with the highest benefit given that it yields minimum required benefits at the worst case scenario.
    a. This approach aims to assure sufficient resource during drought.
    b. Good inventories, banking systems, and asset accumulation possibilities reduce the need for protection against risks.

4.0 Conclusion

Mechanization in Agriculture embraces the use of tools, implements and machines for agricultural land development, crop production, harvesting, preparation for storage, storage, and on-farm processing. Top-down bureaucratic means of transferring technology do work. Rarely is the same technological solution optimal everywhere.Hence the need to select the technology with the highest benefit given that it yields minimum required benefits at the worst case scenario.

5.0 Summary

In this unit you leant that the establishment of an innovative capability starts with a buildup of capacity to support and adopt innovations and new technologies. Innovations respond to need and economic conditions. Inventors, investors, and researchers put effort into solving burning problems, and that leads to innovations. The value of an innovation depends on socio-economic, climatic, and ecological specifics.

6.0 **Tutor-Marked Assignment**

I. What is meant by the term agricultural technology adaptation and appropriateness

II. Explain briefly the concept of differential rates of adoption of new agricultural technology

7.0 **Reference/Further Readings**

Richard E. Just and David Zilberman (1983), "Stochastic Structure, Farm Size, and Technology Adoption in Developing Agriculture," Oxford Economic Papers, Vol. 35, No. 2 (July, 1983), pp. 307-328.

Unit 14

Implication of these Innovation-Decisions

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Table of Contents:

1.0 Introduction

Adoption studies on agriculture technologies have often revealed that farm households that did adopt has systematically different characteristics than the group of farm households that did not adopt. Adopters of improved pigeon pea for example have significantly higher consumption expenditure than non-adopters. It has also shown that adoption of such improved technologies reduces poverty significantly. This confirms the

potential direct role of agricultural technology adoption on improving rural household welfare, as higher incomes from improved technology also mean less poverty.

Inadequate local supply of seeds, equipment, etc. and access to information about the new innovation are key constraints for adoption of such technologies. This implies the need for policy to strengthen and leverage government extension services and rural institutions to promote and create awareness about the existing improved agriculture technologies. The government will need to take the lead in technology promotion and dissemination at the initial stages and in creating an enabling environment for effective participation of the private sector. Awareness campaigns for improved varieties and equipment, combined with improved local availability of improved seeds for example at reasonable prices offer the most promising policy mix to accelerate and expand adoption.

Distance learning refers to the teaching and learning situation in which the instructor and learner are engaging in interactive instructional settings when they are separated geographically by time and place. Distance learning takes advantage of currently available technologies to achieve two main objectives: (a) providing equitable access to quality education and (b) meeting the unique learning needs and styles of individuals. Distance education technology holds great potential for enhancing teaching in most institutions of learning, but faculty must be willing and prepared to use it. Hence, the provision of quality professional development in various areas of distance education would enable educators to make the necessary changes in order to effectively integrate these distance technologies. Change is not always easy, so the integration of various change theories, particularly adoption models, into professional development plans seems

very promising. Many higher education institutions are planning for effective distance education training without significant consideration of the adoption stages and processes that faculty will encounter. The future for improvement of teaching and learning in educational institutions is dependent on effective, quality professional development that integrates the research on change, particularly, the adoption of innovations. The present and future role of distance education, as an innovation, in our educational institutions, seems inevitable, based on past and present research and trends. Hence, the delivery of quality courses and programs using distance technologies may be effectively achieved by integrating models of adoption into plans for professional development in educational institutions.

USAID and its partners will support the formulation of comprehensive science and technology systems appropriate to specific national and regional conditions, strengthen national capacity for conducting research, and promote public awareness of the value of innovation in accelerating agricultural growth. Reducing the knowledge gap in developing countries will require leadership from the professional agricultural research and education communities; expanded participation from agribusiness and market participants; and the development of innovative models for linking producers, entrepreneurs, and agribusinesses to information they need

2.0 Objectives

By the end of this unit, the students should be able to:

I. Explain the implication of Innovation-Decisions

II. Explain the consequences of Innovation-Decisions

3.0 Main Content

3.1 Implication of stages Innovation-Decisions

a) Knowledge Stage

At the Knowledge Stage there is recall of information, comprehension of messages and acquisition of Knowledge or skill for effective adoption of innovation.

b) Persuasion Stage

During Persuasion Stage there is a Liking the innovation, Discussion of new behavior with others, Acceptance of the message, Formation of positive image of the message and innovation and Support for the innovative behavior from the system.

c) Decision Stage

At Decision Stage there is Intention to seek additional information about the innovation and Intention to try innovation.

d) Implementation

At the stage Implementation there is acquisition of additional info about innovation and Use of innovation on regular basis continued use of innovation.

e) Confirmation Stage

Finally, at the stage of Confirmation Stage, benefits of using the innovation is recognized and Integration of the innovation into ongoing routine is achieved and there is promotion of innovation to others

3.2 Consequences of Innovation-Decisions

As the use of some new innovation spreads throughout a group or society, concern must ultimately shift away from "how it happened" to "what impact has it had or will it have." If we desire to possess an understanding of the role and impact of mediated communications in our contemporary society we must explore the outcomes that have resulted from adoption of innovations. The difficulty surrounding the assessment of consequences is based on a number of inhibiting factors. First and foremost is the fact that most consequences resulting from some type of innovation occurs over a long period of time. It is hard to measure and track changes of this kind.

Secondly, those who "sponsor" such investigations tend to be the agencies that introduced the innovation. As might be expected, these agencies tend to think only in terms of the beneficial changes that occur. Undesirable consequences, whether direct or indirect, are very often overlooked or never recognized.

Thirdly, it is very difficult to directly identify a resultant effect because they are very often mixed together with other changes that have occurred.

And finally, evaluations of positive versus negative consequences can be a relative or subjective decision. Cultural, political, and personal bias will play a major role in how we view the outcomes of some new innovation. In spite of these difficulties, we must still strive to access the changes that new modes of communication inject into our social environment.

Rogers suggests that we analyze consequences across three dimensions:

1) Desirable versus undesirable consequences.

2) Direct versus indirect consequences.

3) Anticipated versus unanticipated consequences.

Desirable/Undesirable Consequences

Desirable consequences are those outcomes which are seen as functional to the social system and individual members of the group or society. On the other hand, undesirable consequences are those which are seen as having dysfunctional impacts on individuals or society. The consequences of an innovation are rarely completely desirable or undesirable, so many times we must weigh and assess the functional contribution of some innovation against the dysfunctional effects. Because most new innovations have a tendency to displace the older, more established methods or technologies, we can find the weighing of desirable versus undesirable consequences difficult -- new innovations benefit some and hurt others.

For example, in the 1960's, the widespread adoption of cable television was strongly opposed by local television broadcasters. This innovation was seen as very undesirable by this group because it would very likely shrink the audience for their programs. While the possible economic impact on local broadcasters was dysfunctional to their financial interests (and their concerted lobbying efforts resulted in strict regulation of cable operators), the broader availability of program options were seen as a functional outcome which would benefit a larger portion of the public. An important issue surrounding the evaluation of desirable versus undesirable consequences is that it

is generally not possible to eliminate the dysfunctional effects and keep only the functional ones. We must accept the good with the bad.

Direct/Indirect Consequences

Direct consequences are the immediate and causally-linked changes that occur due to the adoption of an innovation. For example, in the early 1950's the widespread adoption of television caused a significant and severe drop in attendance at movie theaters. A direct consequence of television was the displacement of the local movie house as a primary source of family entertainment. Indirect consequences are the changes that occur in response to the direct consequences. The film industry attempted to attract families back to the movie theaters by introducing Panavision (wide screens), 3-D, and color films -- enhancements that television couldn't offer at the time. These changes that occurred in the film industry are indirect consequences of television's widespread adoption in the 1950's.

Anticipated/Unanticipated Consequences

Anticipated consequences are recognized and intended changes that occur as a result of the adoption of a new innovation. For example, the widespread "computerization" of banking has made credit purchases and financial transactions quick and painless. We can now make credit purchases anywhere in the world -- with no questions asked -- as long as our computer-based financial file indicates that we are "credit worthy." This is an anticipated outcome of the computer-based credit systems. Financial transactions are now easy, fast, and convenient.

However, the introduction of this innovation to banking has brought some unanticipated consequences as well. Unanticipated outcomes are changes brought on by an innovation that are not expected, recognized, or intended. Very few of us anticipated that the widespread availability of credit would alter our sense of privacy. Historically, our individual financial dealings were looked upon as very private and personal. This information was held in the strictest confidence by our banker. But now, our "credit worthiness" and our financial profiles are part of the "semipublic" computer files that provide us with the fast and convenient credit we have come to expect. A financial "blueprint" of our lives can be accessed at the touch of keyboard by the companies and individuals with whom we do business. This loss of privacy has come to be viewed as one of the costs of instant credit -- an unanticipated outcome that is, at the very least, an undesirable but tolerable consequence.

4.1 Conclusion

Successful efforts to diffuse an innovation depend on characteristics of the situation. Knowledge: it occurs when an individual is exposed to the innovation's existence and gains some understanding of how it functions Persuasion: it occurs when an individual forms a favorable or unfavorable attitude toward the innovation Decision: it occurs when an individual engages in activities that lead to a choice to adopt or reject the innovation Implementation: it occurs when an individual puts an innovation into use Confirmation: it occurs when an individual seeks reinforcement of an innovation decision or reverse the previous decision due to the conflict

5.0 Summary

The implication of innovation decision with respect to when the knowledge is acquired, persuasion stage, and stage of decision making, implementation and confirmation was discussed in this unit. You also learnt that the present and future role of distance education, as an innovation, in our educational institutions, seems inevitable, based on past and present research and trends. Hence, the delivery of quality courses and programs using distance technologies may be effectively achieved by integrating models of adoption into plans for professional development in educational institutions. Finally we analyze consequences across three dimensions: desirable versus undesirable consequences, direct versus indirect consequences and anticipated versus unanticipated consequences.

6.0 Tutor-Marked Assignment

1) Enumerate and explain the implication of Rogers' Stages of Innovation Decision process.

7.0 References/Further Readings

- Rogers, E. M. (1983). *Diffusion of innovations* (3rd ed.). New York: The Free Press.
- Rogers, E.M. (1995). *Diffusion of innovations* (4th ed.). New York: The Free Press.

Unit 15

Factors of Effective Agricultural Extension in Rural Areas

Table of Contents:

1.0 Introduction

Farmers in rural areas view agriculture extension as a form of assistance to help improve their know-how, efficiency, productivity, profitability, and contribution to the good of their family, community, and society. Agricultural extension therefore aims to enhance and accelerate the spread of useful know-how and technologies to rural people. These activities are expected to lead to increased and sustained productivity, increased income and well-being of farm people, and to the promotion of national food security and economic growth. But poor infrastructures, the lack of agreement on the functions of extension, the clientele to be served, how extension will be financed, frequent changes in organizational structure

and programme priorities, rapid turnover of the extension staff, and the proliferation and lack of coordination between different organizations that undertake extension work are some of the common problems of agriculture extension in Nigeria.

2.0 Objectives

By the end of this unit, the students should be able to:

- Identify and explain the factors required for effective agriculture extension in rural areas.

3.0 Main Content

3.1 Factors of Effective Agricultural Extension in Rural Areas

The ultimate role of agriculture extension is the impact that extension is having on the productivity of all major groups of farmers, including their incomes and quality of life. An effective extension should contribute to sustainable agricultural development in rural areas. The factors below focus on innovation diffusion and improving agricultural extension system in Nigeria according to FAO (1998).

a) **Need for a Change in Agriculture Extension Policy, Mission and Goals**- Nigeria is largely an agricultural economy with the majority of the population deriving their income from farming especially in the rural communities. Most policy interventions have focused on “food security”, a term that is used to cover key attributes of food such as sufficiency, reliability, quality, safety, timeliness and other aspects of food necessary for healthy and thriving populations. Although extension has a generic and universal meaning, its mission

and goals may need to be adjusted according to national objectives and the context and stage of agricultural and rural development in a given country. This mission should be reflected in a statement of goals and objectives that are agreed upon and assigned to extension in a supporting policy document. This document should be periodically reviewed by policy makers and representatives from stakeholder groups based on their needs.

b) **Technological Advancement**-Agriculture in Nigeria is faced with enormous technological challenges. But they also have access to a much larger pool of scientific and technical knowledge that was not available when the Green Revolution was launched. This exploration will also include an examination of local innovations as well as indigenous knowledge. It will cover fields such as information and communications technology, genetics, ecology and geographical sciences. It will emphasize the convergence of these and other fields, and their implications for Nigerian agriculture.

c) **Enabling Infrastructure-** Enabling infrastructure (covering public utilities, public works, transportation and research facilities) is essential for agricultural development. Infrastructure is defined here as facilities, structures, associated equipment, services, and institutional arrangements that facilitate the flow of agricultural goods, services and ideas. Infrastructure represents a foundational base for applying technical knowledge in sustainable development and relies heavily on civil engineering. Provision of an enabling infrastructure for agricultural development is very important. Modern infrastructure facilities will need to reflect the growing concern over climate change and food insecurity.

Nigeria's poor infrastructure represents a unique opportunity to adopt new approaches in the design and implementation of infrastructure facilities.

d) **Agricultural Innovation Systems**-The use of emerging technology and indigenous knowledge to promote sustainable agriculture will require adjustments in existing institutions. New approaches will need to be adopted to promote close interactions between government, business, farmers, academia and civil society. Positioning sustainable agriculture as a knowledge-intensive sector will require fundamental reforms in existing learning institutions, especially universities and research institutes. Most specifically, key functions such as research, teaching, extension and commercialization need to be much more closely integrated.

e) **Extension Approach and Functions**-National extension systems can pursue one of several different extension approaches in implementing extension policy. An example of a technology transfer approach is the Training and Visit (T&V) extension system that has been promoted by the World Bank through its lending programme. Although the U.S. extension system has been particularly effective in technology transfer, its main focus has been on increasing the skills and knowledge of rural farm families, who have become very effective consumers of agricultural technology. There is need to enhance the T&V approach with participatory activities that will involve the farmers such as the farmer-field school.

5. **Geographical Coverage**-Geographical coverage can be an important policy issue because of both political and cost implications. If extension funding is to be provided by different levels of government (cost sharing), then the structure of extension must reflect these different sources of funding. Extension personnel will tend to be more responsible to those levels of government that provide extension funding. For example, if Local Governmental Authority (LGA) provides some extension funding, then extension personnel will tend to be more responsive to the needs of farmers and political leaders within these LGA, than they are if all funding comes from the national government. Therefore, having multiple sources of funding, especially from different levels of government, will increase the number of shareholders and result in an extension system that has a broader base of support and that is more responsive to stakeholders at the local level. Investing in resource poor farm families may increase their technical, management, and leadership skills, thereby enabling them or their children to move into higher paying, nonfarm jobs.

6. **Clientele or Target Beneficiaries**-A common criticism of extension services in developing countries is their neglect of the vast number of small-scale farmers in favour of fewer numbers of large farmers, or the very limited attention given to women farmers. The inclusion of women and rural youth in agricultural extension programmes is generally recognized in terms of their numbers and contribution to farming. Rural youth may account for up to 60 per cent of the population in developing countries, therefore they should be specially recognized for their crucial role in achieving sustainable agricultural and rural development.

7. **Organizational Issues**-The extension organization embodies different aspects of an extension system, and it provides the management framework for the extension service. This affects the scope, magnitude, and structure of the extension system, including factors such as control, cost-effectiveness, and the impact of the extension service. Government project/policy should be bottom-up approved in order to feel the pause of the farmer before deciding on what to do for the farmers. Four different forms of extension organization include centralized organization, decentralized organization, centralized extension and funding; and pluralistic forms of a national extension system. In Nigeria, almost an invisible a national extension office exists because extension programming, management, and the control of activities and resources are vested with state governments that may not provide fund. The pluralistic forms of a national extension system are an emerging form of extension organization in many countries. This structure appears to occur in those countries where the need for extension services is widespread and/or where the public agricultural extension organization can no longer satisfy its clientele because of resource and management problems. As a consequence, many publicly and/or privately funded organizations, including nongovernmental organizations (NGOs), ministry of agriculture, state-funded agricultural colleges and universities, commodity boards, agro-business firms (contract extension), farmer organizations, cooperatives and commodity associations are beginning to conduct agricultural extension programmes in an integrated manner.

8. **Extension Funding**-The most difficult and challenging issue facing extension today is to secure a stable source of funding. The government has the impression that public extension is both expensive and a drain on the government's limited resources. Studies carried out in

both developed and developing countries indicate that the returns to extension expenditures are high. Therefore, increased level of public funding is necessary to support extension in relation to the needs of farmers in the country. In Nigeria, absolute levels of extension funding are very low. The Federal Government must believe in long term benefits that can be derived from investing in extension services. Extension should therefore provide constant/periodical reports of the various activities, including progress and limitations. The funding for extension should be increased to levels that reflect the anticipated economic rates of return and the social benefits when public funds are properly invested and managed.

9. **Extension Staffing Issues**-By the nature of the mission and work that an extension system carries out; its worth to society is largely reflected by the quality and number of the technical and professional staff in the organization. Based on the scope of and available resources, qualification, number of extension staff to be employed by the extension system; proportion of subject-matter specialists to field extension workers; proportion of field extension personnel to the number of farmers, farm households, or other target groups; deployment method of extension staff, frequency of transfer, incentives to be provided in order to ensure that they work closely with all groups of farmers are crucial issues to be considered. The government should recruit more extension personnel and make all available working materials available to them, but at the right time. As senior officers are retiring, new ones must be employed to ensure that knowledge is transferred. Provision of incentive for the field officers and Subject Matter Specialist to have motor cycle and vehicle respectively to facilitate movement to their various cells is important. Payment of

allowances and kilometer claims regularly at the right time to enhance adequate visits to farmers, prompt payment of allowances and remuneration to extension personnel will be necessary and important, if agriculture is to move forward. Extension personnel must be encouraged to stay with the farmers in the rural areas and facilities to make them comfortable

should be provided. There is also need for training and re-training within the field officers to up-date their knowledge for effective dissemination of extension messages.

10. **Stability**-A good extension policy promotes extension system stability, but need to allow sufficient flexibility to reflect the dynamic nature of the agricultural sector. Extension should not be rigid but should be responsive to all major groups of farm people and sufficiently inclusive to allow public, private, and non-governmental organizations to contribute fully to the agricultural development goals of the country. Frequent organizational changes within extension, such as being transferred from one government agency to another, directly impact the organization's effectiveness. Such instability is costly in that trained staffs are poorly utilized and opportunities for improved productivity are forgone. Extension policies in some countries have been successful in preventing disruptive and destabilizing. All bottle-neck bureaucracies from the Government (Federal, State and Local government) must be removed to prevent late release of fund.

11. Business Development

The creation of agricultural enterprises represents one of the most effective ways to stimulate diffusion and adoption of Innovations. These will include direct financing, matching grants, taxation policies, government or public procurement policies and rewards to recognize creativity and innovation. New tools such as information and communication technologies can be harnessed to promote entrepreneurship.

4.2 Conclusion

There is need to disseminate policy-relevant information on how to align science and technology missions regional agricultural development goals. It does so in the context of the larger agenda to promote rural economic integration and development.

5.0 Summary

Factors enhancing effective agricultural extension in rural areas have been discussed in this unit. It has outlined the need for changes in policies, technology, infrastructure; approaches in innovation system, extension activities, stability and business development as factors needed to promote agricultural extension in rural areas.

6.0 Tutor-Marked Assignment

- Discuss the factors that can enhance agriculture extension in rural areas in Nigeria

7.0 Further Readings

FAO (1998) *Improving Agricultural Extension, A Reference Manual*, Edited by Burton E. Swanson Robert P. Bentz and Andrew J. Sofranko, http://www.fao.org/docrep/W5830E/W5830E00.htm