EVALUATION OF THE ROLES OF VISUAL INSTRUCTIONAL MATERIALS IN AGRICULTURAL EXTENSION SERVICES IN THE NORTH-WEST ZONE OF NIGERIA

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A DISSERTATION SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES, AHMADU BELLO UNIVERSITY (ABU), ZARIA, NIGERIA, IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF DOCTOR OF PHILOSOPHY INDUSTRIAL DESIGN

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DECLARATION

I declare that the work in the dissertation entitled "Evaluation of the Roles of Visual Instructional Materials in Agricultural Extension Services in the North-West Zone of Nigeria" has been performed by me in the Department of Industrial Design under the supervision of Professor JDM. Yakubu, Dr. S.U. Dakyes and Professor M. Mahmmud. The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this dissertation was previously presented for another degree or diploma at any university.

	_____	_____
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CERTIFICATION

This dissertation entitled "EVALUATION OF THE ROLES OF VISUAL INSTRUCTIONAL MATERIALS IN AGRICULTURAL EXTENSION SERVICES IN THE NORTH-WEST ZONE OF NIGERIA" by Ndahi, Paul Ajiya meets the regulations governing the award of the degree of Doctor of Philosophy degree in Industrial Design Department, of the Ahmadu Bello University, Zaria, and it has been approved for its contributions to knowledge and literary presentation.

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LIST OF ABBREVIATION

1.	**A.B.U**	-	Ahmadu Bello University
2.	**A.D.P**	-	Agricultural Development Projects.
3.	**A.E.S**	-	Agricultural Extension Services
4.	**A.V.A**	-	Audio Visual Aids.
5.	**A.V.**	-	Audio Visuals
6.	**D.A.C**	-	Division of Agricultural Colleges.
7.	**F.M.A.R.D**	-	Federal Ministry of Agriculture and Rural Development
8.	**F.M.P**	-	Farmer Managed Plots
9.	**F.O.A**	-	Faculty of Agriculture
10.	**G.D.P**	-	Gross Domestic Product
11.	**I.A.R**	-	Institute for Agricultural Research
12.	**G.N.P**	-	Growth National Product
13.	**M.T.R.M**	-	Monthly Technology Review Meeting
14.	**N.A.E.R.L.S**	-	National Agricultural Extension Research Liaison Services
15.	**N.G.O.**	-	Non- governmental Organizations
16.	**N.W.Z**	-	North West Zone.

17.	**R.P**	-	Resource Persons.
18.	**S.C.A**	-	Samaru College of Agriculture
19.	**SMART**	-	Skills, Motivate, Activate, Retrain and Train
20.	**S.M.S**	-	Subject Matter Specialists**.**
21.	**T.R.M**	-	Technology Review Meeting
22.	**T&V**	-	Training and Visit
23.	**V.E.A**	-	Village Extension Agents.
24.	**V.I.A**	-	Visual Instructional Aids
25.	**V.E.L**	-	Visual Extension Linkages
26.	**V.I.M**	-	Visual Instructional Materials

OPERATIONAL DEFINITION OF TERMS

1. **Balance** - Keeping steady design elements that exist on instructional material in equal or reasonable measure.

2. **Bulletin Board** - This is also known as plain surface board set aside for displaying many agricultural extension information items of interest and educational value.

3. **Chalk Board** - It is popularly known as blackboard in universal visual informal schools and agricultural extension training.

4. **Consensus** - Generalized acceptance of agricultural extension visual instructional material usage.

5. **Exhibit** - An arrangement of agricultural extension materials designed to inform the audience about a subject of educational significance.

6. **Flex Materials** - Synthetic surface material use for high technological digital printing in agricultural extension display.

7. **Impact** - Goal attainment as long-term influence on the usage of agricultural visual instructional materials viability and creditability.

8. **Model** - Objects and representations of things displayed along with specimen and exhibits.

9. **Perception** - Individual understanding of ideas of a given visual instructional material.

10. **Performance** - Ability of any given visual instructional material to have influence on the user or target group.

11. **Performance Aids** - Facilities used in visual instructional materials production

12. **Pictures** - Versatile and effective visual aids, it could be black and white or coloured photographic print.

13. **Posters** - Agricultural extension services notice designed to make public announcement of innovative technology. Usually include few words with an illustration or picture for vivid impact.

14. **Shape** - A graphical outline use for agricultural extension visual instructional design, simple and in any form to illustrate a point.

15. **Slides** - A transparent film picture projected by flash light through it, good for teaching sequential procedures.

16. **Space** - An opening around visual elements in design

17. **Specimen** - May be part of an object or one for a group or class to represent the whole group.

18. **Texture** - A visual element that serve as a replacement for the sense of touch.

19. **Transparencies** - Clear cellophane sheets used in projecting images drawn or typed

20. **Roll-up Banners** - Standing banner with a metal stand and hanger.

21. **Role Theory** - Study of behavior that are characteristic of persons within contexts and within various processes that presumably produce. Explain, as are affected by those behaviors specially in agricultural visual instructional materials usage

22. **Rubber Cement** - Making substance in manual preparations techniques of using assorted colours in visual instructional material production for agricultural extension.

ABSTRACT

This study evaluated visual instructional materials roles in agricultural extension services in the North-West Zone of Nigeria, comprising seven states Kaduna, Kano Katsina, Kebbi, Sokoto and Zamfara. The total number of respondents randomly selected was 56 agricultural extension agents and 14 respondent farmers through the use of both purposive and random sampling techniques in the study area. Data were analysed using Statistical Package for the Social Sciences (SPSS). The findings revealed that 70% respondents were male, 30% were female. In gender variation male users of visual instructional materials in agricultural extension services were dominant. The study also found that 62% of the users were between the ages 18-39 years, and those of ages 40-59 years constituted 34% while those within 60 years and above were 4%. The result showed 87% of the users were married with 12% being single, 1% where divorced. Youths were higher in number which may be attributed to high rate of unemployment in Nigeria. The evaluation found that the level of awareness of participants farmers and extension agents across the Zone and the overall roles impact in agricultural activities were significantly greater in technology adoption through the usage of visual instructional materials. The findings further showed the educational status of the users. The data shows that 12% had primary education, 24% secondary education, while majority had tertiary education of 64%. Language preferred by users was English which ranked 62.3%. Also, the data reveals that Hausa has 27.4% and Arabic (Ajami) 10.3%. The results also showed illustration and pictorial representation had 78.8% level of effectiveness in designing visual instructional materials for agricultural extension usage, and 86.5% accepted colour usage while 13.5% did care much about colours in visual materials. The findings further revealed usage of visual materials in agricultural extension activities very effective ranking 50%, and effective 38.5% while usage in a specially organized extension programmes level of effectiveness at 61.5% and farmers' adoption of new ideas was over 80% across the seven states. The evaluation further disclosed that the seven states in the Zone used visual instructional materials extensively where Kebbi state ranked 82%, Kaduna 78%, Katsina 69%, Jigawa 62%, Kano 60%, Zamfara 58% and Sokoto 42%, while each state visuals used indicated posters ranked 96%, sign posts 84%, banners 78%, illustrations 74%, flyers 65% Charts 62% and photographs 45%. The results of Chi-square (χ^2 calculated) tests procedures of research hypotheses on visual instructional usage and adoption were statistically significant at 5% level. This led to the rejection of the mull hypotheses and the affirmation that the roles of visual instructional materials usage in agricultural extension services had significant effects on the livelihood of rural farmers in adopting new ideas in agricultural practices thereby improving their quality of life. The test of visual usage overall was significant at 90% and overall adoption at 87.5%. However, the study also identified some constraints limiting the optimal usage of visual instructional materials ranging from:- (a) lack of adequate trained extension agents, (b) lack of adequate trained graphic artists, (c) ignorance of the participants involved, (d) organizational impediments, (e) lack of required instructional visuals, (f) lack of adequate capital, (g) differing perspectives, (h) language barriers and (i) illiteracy level. However, despite the numerous constraints the evaluation indicated significant levels of visual instructional materials usage and adoption among farmers and agricultural extension agents across the

North-West zone of Nigeria. Finally, the following recommendation were made:- Based on the overall findings, it is therefore recommended that the usage of graphic visuals in agricultural extension activities should be encourage to use visual instructional materials for effective communication in all agricultural programmes. The youths should be encouraged to get involved in agricultural extension programmes to sustain the agricultural sectors and similar sectors to reduce the level of social and security problems associated to youth's unemployment in the country and the world at large.

CHAPTER I.

INTRODUCTION

1.0 Background to the Study

Agriculture has been recognized as the most important sector of the economy of developing countries. Developments in this sector have therefore, frequently attracted attention of governments, scholars, and citizens of these countries as well as international organizations. This has been particularly true in Nigeria where declining productivity and rising population in the last two decades have led to a growing concern over the need and opportunity for agricultural development (Atala, 2006).

However, not enough effort has been invested in research to design and implement effective extension programmes that are appropriate to the needs of the majority rural farmers, who are the producers of the bulk of the country's food and raw materials

Agricultural Extension is an informal educational process which aims to teach farmers how to improve their level of living by their own effort, through making wise use of natural resources at their disposal for better systems of farming and homemaking, for the benefit of the individual, the family, the community and the nation at large. (IAR Extension Roll-Up(2013), www.abu.edu/institute.iar,(2014).

In the Institute for Agricultural Research (IAR), Samaru mandate covering the North-west states, the Agricultural extension services was established to develop and maintain strong research extension farmer linkages for the purpose of effective dissemination of research results to end-users to:

a. Provide knowledge and skill training programmes for extension staff of State Agricultural Development Programmes (ADPs), Agricultural agencies and selected farmers through regular Technology Review Meetings (TRMs) and specialized in-service courses, Workshops, Seminars etc.

b. Disseminate Agricultural research-based information to ADPs, Federal and State ministries, agro-industrialist and agricultural producers.

c. Perform community services including consultative diagnostic/advisory services.

d. Collaborate with National Agricultural Extension Research and Liaison Services (NAERLS) and other relevant Institutes and organizations on extensions activities.

There are some components/activities in agricultural extension services, they include:- Technologies Review Meeting (TRMs), Trainings, Cropping Scheme Meeting, Zonal Steering Committee Meeting, Zonal Technical Committee Meeting, Zonal REFILS Workshop, SIWES/ITF Coordination, Diagnostic/Consultative Services, Publications, Radio/T.V. Programmes, Field Days, Farm Walks, Exhibition/Fairs, Agric Shows, Adoption Villages/Demonstration Schools and Monitoring/ Evaluation.

iarabuzaria1922@gmail.com.www.abu.edu/institute.iar (2012)

This study examines the role and the impact of visual instructional materials in Agricultural extension services in the North-west zone of Nigeria. The perception, design, usage, impact of visual instructional materials on agricultural development, and factors influencing them are the major issues of investigation in this study.

1.1 Statement of the Problem

The agricultural extension systems in place today are operating simultaneously with other organs of agricultural farming systems without giving enough or attention consideration to information dissemination processes and the roles of agricultural visual instructional materials in agricultural practice. Perhaps the most important aspect of these systems is the fact that little or no empirical evaluation research has been carried out to determine the problems affecting their performances and to propose solutions to them. The agricultural extension systems are fast spreading all over the country even though the success of the previous effort has been inadequate and its replicability on a wider scale in the North-west zone is yet to be ascertained (IAR, Samaru, 2013 and iarabuzaria1922@gmail.com 2012)

The study situation suggests that the role performance of extension agents is problematic and contributes to the general problems in Nigerian agriculture. One of the key issues in the ineffectiveness of Nigerian agricultural extension is impact in the farming systems of the North-West agro-ecology. The roles and impacts of extension materials' and agents' activities vary and are often ineffective (Atala, 2006). The problem becomes that of explaining the differential roles and impacts of agricultural extension system, and this provides the rational and quest for undertaking this study.

1.2 Aim of the Study

The aim of this study is to examine the role of Agricultural extension visual materials on Agricultural extension services offered in the North West Zone of Nigeria.

1.3 Objectives of this Study:-

1. Examine the components on agricultural instructional materials such as posters, flyers and banners being delivered to farmers.
2. Evaluate the impact of agricultural extension visual instructional materials on the quality of rural agricultural practices and rural life.
3. Assess the role of training agricultural extension agents and farmers on the use of agricultural instructional materialism the North-west zone.
4. Evaluate the set variables posited or presumed as explaining differential impact/effect on information delivery through visual instructional material in agricultural extension.
5. Determine language preferred by users, that is English, Hausa, or Ajami (Arabic) across the Zone.

1.4 Research Questions

This study will attempt to answer the following research questions.

1. What would be the effect of visual instructional material messages on farmers, extension agents on agricultural extension services in the North-Western zone of Nigeria?

2. What are the specific role performance of the extension facilities that enhance the perceived impact of visual instructional materials on agricultural practice and the quality of rural life?

3. To what extent have training and usage of instructional materials improved performances of the extension agents, graphic artists, resource persons and farmers in North-Western Nigeria?

4. To what extent do set variables posited or presumed as explaining differential instructional materials role on information delivery through visual instructional materials in agricultural extension?

5. Which is the Language preferred by users of visual instructional materials across the North- West zone?

1.5 Significance of the Study

This study will glean data and proffer analytical guidelines for improving the performance of agricultural extension system in the North-West zone of Nigeria. Specifically, there is a paucity of data on the role and performance and the impact of extension materials. There is therefore inadequate research information on these aspects that would help in understanding some of the problems and challenges faced in agricultural extension system. Such information is essential for a proper assessment of the needs and potentials of visual instructional material in extension system. It could also form the basis for improving the quality of extension services and agricultural communication and subsequently, farmer adoption of improved technologies and Agricultural Development strategies.

1.6 The Present Situation and Focus of the Study

Planned agricultural development involves three systems, namely; innovative, communicative, and practitioner systems, Conghenour (1968) is of the opinion that the

innovative system is responsible for generating or adopting new technologies, while the communicative and instructional system disseminate the technologies to the farmer who utilizes the technologies to improve yields and quality of rural life.

The present situation is characterized by poor evaluation of the role and impact of visual instructional materials use in disseminating agricultural innovative technologies in the North-west of Nigeria. Agricultural extension in developed countries is an important communication system and if exploited well, it has great and obvious potential contribution for agricultural and rural development in developing countries. However, Akinbode (2007) and Wang (2009) stated that the performances of agricultural extension systems in developing countries have fallen short of expectations.

In Nigeria Agricultural extension seems to be relatively ineffective. In Kaduna State of for example, the few studies conducted by (Voh, 1979 and Atala, 1980) reveal a wide gap between awareness and adoption of improved agricultural technologies among farmers in the state.

1.7 Scope and Delimitation of the Study

The study scope include extension agents and farmers that use visual instructional materials in agricultural extension services. This study is specifically concerned with identifying and evaluating the roles of design and impact of visual instructional materials in agricultural extension services in the North-West zone of Nigeria. This covers seven states namely, Kaduna, Kebbi, Kano, Katsina, Jigawa, Sokoto and Zamfara.

CHAPTER II.

REVIEW OF RELATED LITERATURE

2.1 Introduction

In order to understand and appreciate the present research problem, it is important to provide a historical and contemporary background of issues underlying the research problem.

Agriculture in Nigeria is considered as the backbone of the country's economy even during the 'oil boom' era. Atala (1987) notes that its major contributions are several; provides food and raw materials (Cotton, leather, rubber etc) for the country's consumption and exportation. For instance, at independence in 1960, about 70 percent of Nigeria's Gross Domestic Product (GDP) was attributable to agriculture (Nelson, 2000). However, in 1980, the proportions had been altered by the increasing contributions of manufacturing, the oil industry and other economic sectors. Agriculture now contributes less than 20 percent of the Growth National Product (GNP) (Abalu and Atala, 2006)

Evidently, all of these contributions have been declining in magnitude and quality. For example, in the early 1960s, Nigeria was a net exporter of crops such as oil palm, groundnuts, cocoa and other agricultural products like cotton and rubber. By the early 1970s, Nigeria was importing food (Abalu 1979 and Atala, 2006).

2.2 Agricultural Extension and Agricultural Development in Nigeria

During the colonial period (1880 – 1960) extension services were primarily oriented towards promoting the production of export crops. Extension contact was

minimal and consisted mostly of issuing improved seeds to export crop growers (Noma, 2010). The role of the extension agents as field representatives of colonial government which was enforcing rules and regulations regarding agricultural practices such as land conservation received greater attention than giving advice and left a legacy of distrust for government extension agents. Also, there was little or no training for agricultural extension agents.

Agricultural Extension in Nigeria is one of the areas depicting government's policy of neglect for rural areas, agriculture and food production. Due to the government's general neglect of agriculture and food production, extension services in the north-west zone of Nigeria have equally received little attention. Extension is still slow and unattractive in Nigeria today. Similarly, usage of visual instructional materials had been generally overlooked by extension agents, and they are significant in agriculture and rural development. This situation sustains the long standing skepticism surrounding the effectiveness of extension services since the colonial period (Akinbode, 2007).

2.3 Visual Instructional Materials in Agricultural Extension

Effective graphic materials are essential for the successful agricultural information dissemination. Agricultural extension services have been carried out in the North-West agricultural zone long before independence. Misari (2004) reported that the IAR Samaru and NAERLS Zaria have been at the centre of all the extension activities in the zone. Primarily, these Institutions offer training, teaching and research for all categories of agricultural extension agents in the North-West Zone.

During the process of teaching, training, research and extension, different visual instructional materials were introduced and used by numerous instructors. Some of these were used on station in the states. The types of visual instructional materials vary from hand written sketches to electronically and mechanically processed ones. They include:- Hand drawn maps and charts posters, Transparencies and projected slides, Power-point projections and Roll-up-Banners.

Similarly, the Agricultural Development Projects (ADPs) have equally at one time or another, developed their own instructional visual materials for use at Monthly Technology Review Meetings (MTRM), Forth-Nightly Training (FNT) and related forum. The same is true of other International Agricultural Research Institutes and the Non Governmental Organization (NGOs).

2.4 Role of Instructional Materials in the Learning Process

There has been increasing evidence of significant contributions of instructional materials to educational advancement. When carefully designed, high quality instructional materials can ensure effective learning process, effective delivery, reduced learning time, enhance individual's attitude to the learning process and changing roles for instructors. These are possible especially where the instructional materials are not of high quality only, but also selected, produced and used as an integral part of an instructional programme (Akolo, 1986). However, for any instructional programme to be successful, Arokoyo (1986) recommends that there must be a determination of who the programme is being developed for (learners), what is imparted; how (method) the subject (skill) is best learned, how to determine the extent to which learning occurs (evaluation).

It is also reported by Williams (1978) that instructional materials may be classified into two broad categories; projected and non-projected visuals. Among the non-projected visuals are: the chalk board; the bulletin boards; the flannel board (flash cards, posters and so on) pictures; models; specimen, exhibits fly slip charts and so on. On the other hand, projected visuals may include transparencies; slides; opaque devices and so on.

According to Noma (2008), visual instructional materials must be chosen according to the objectives of a programme and the situation. Five criteria have therefore been suggested by Noma, namely; (i) content (ii) availability (iii) trainee characteristics (vi) audience and (v) familiarity.

2.5 Role of Instructional Materials in Agriculture Extension Services

Visual instructional materials have assumed importance in the process of disseminating new innovations in agriculture and in many other technical fields. Today, the need of revamping the agricultural sector is one of the greatest challenges in the developing countries. Part of the strategies to squarely face these challenges is to improve instructional and communication capabilities of which visual instructional materials are a major part (Ndahi 2004).

Instructional materials provide powerful tools for making agricultural teaching more effective (Akolo, 1996). This is because they help in highlighting key points, gaining learner's attention, adding variety, keeping the instructor on track and maintaining consistency and emphasis. Gagne and Robert (1987) found that by the use

of visual instructional materials, learning is improved by 20%, retention is improved by up to 38% and easy to explain complex subjects, it is reduced by 25% to 40%.

Since the main task of agricultural extension workers is to impart knowledge and skills to farmers, the need for effective message presentation is vital. It is imperative that extension workers must ensure that all facts, concepts and ideas are made meaningful to farmers. Visual instructional aids can facilitate the achievement of such goals (Yazidu, 1973). Effective communication within and without the research extension linkage system is critical to radical improvement of agricultural production in Nigeria (Atala, 2008).

2.6 Visual Instructional Materials Design and Layout

The process of combining the various elements that comprise visual materials (picture or art work, lettering, texture, colour and so forth) in order to create a pleasing entity is known as layout design. The layout must be understandable, legible, and aesthetically pleasing in terms of the purpose it is designed to serve (Ndahi, 2004).

2.6.1 Design Principles

The design of visual instructional materials for Agricultural Extension must employ design layout that is guided by the principles of graphic design. Design principles to consider include, simplicity, unity, emphasis and balance.

Simplicity – Charts, graphs and diagrams suitable for page printing may not be suitable for projection. They may include large amounts of information and can be used in a printed report for a manual, which require detailed close-up study, which is not ideal with

projected materials. Sikandra (2008) and Siegel, *et al* (1978) reported that the fewer elements that are used in a given space is divided, the more pleasing it is to the eye". Therefore, in visual instructional materials production, it is better to subdivide or redesign lengthy or complex data into a number of easy-to-understand related materials, limit the verbal content for projected visuals to 15 or 20 words. Drawings should be bold, simple and contain only key details.

Unity - The relationship that exists among the elements of a visual when they are perceived as one entity all functioning together (White, 2009). This is also recommendable for any visual instructional material design and practice.

Emphasis - Even though a visual treats a single idea and is simply developed, there is often the need to give emphasis to a single element to make it the center of interest and attention. Defever (1971) reported that, "through the use of emphasized relationships, perspective, and such visual tools as colour or space, emphasis can be given to the most important elements."

Balance - There are two kinds of balance – formal and informal (Smith and Dorothy, 1985). Formal balance is identified by an imaginary axis running through the center of the visual dividing the design so that

one half will be the mirror reflection of the other half. An informal balance is static, without a mirror reflecting the often half.

2.6.2 Design Elements in Visual Instructional Materials

The design of visual instructional materials for agricultural extension use must employ design layout that is guided by manipulation of graphic design elements. Design elements to consider include: colour, size, shape/space and line that are considered for this study.

Colour - The attractiveness of colour, when used carefully in agricultural visual instructional materials, gives value addition and can influence your audience to the message on the design (Ndahi, 2004).

Size - In illustrating agricultural visual instructional material, the sizes of related ingredients in the design, such as visual elements and typography need to be effectively controlled for effective visual communication.

Shape/Space An unusual shape can give special interest to a visual, open space around visual elements and word will prevent a crowded feeling, only when space is used carefully can the elements of design become effective.

Line - A line in a visual instructional design can connect elements together and it will direct the viewer to study the visual aids in a specific sequence (Defever, 1971).

2.7 Production Principles of Agricultural Visual Instructional Materials

Attractiveness of visual materials is determined by many elements. The important ones among them are colour, size, shape and illustration. The message should be brief. It should be legible, easy to comprehend, and must to be clearly understood. Having considered all these, the designer should choose the medium for communicating the message, in words, pictures, diagrams and related symbols (Akolo, 1986).

The local production of instructional materials takes on at least 3 levels:- conceptual creativity, design and mechanical preparation. During the planning of the materials, attention must be given to factors such as identified in serving objective adaptability for certain individuals or groups flexibility in method of usage and integration with other experiences (Akolo,1986).

The skills developed in interpreting, responding and using visual representations of reality (that is, visual intelligence) result in what is called visual literacy. The process of visual literacy therefore, involves the ability to recognize and read graphic/photographic illustrations representing objects, events, places or people, to sort and organize such visual representation into patterns and relationships that apply vocabulary of non-verbal visual expression; productive use of visual materials as their own interpretation of actual objects, events, places and people (Amiel, 2005).

2.7.1 Format Specifications of Visual Instructional Materials Production

In developing artwork, a number of important points are considered; reliance on appropriate format either vertical or horizontal will save time and ensure good reproduction quality, because the right visual will be sorted out before putting it on paper.

By choosing the proper format, could build a good presentation in terms of visual display in relationship with other elements (Dorothy and Smith 2009).

2.7.2 Illustrating Techniques and Instructional Materials

Eastman (1971) considers it desirable that creative individuals should take advantage of the ever-increasing awareness of the many valuable visual materials now available in magazines, newspapers, and other printed sources, to improve the quality of production of instructional materials based on some of their own visual ideas. When the decision has been made to visualize an idea and the purpose, content, and method of presentation, the production problems of the basic illustration arises. The difficulty in forming the image physically on paper or acetate is frustrating to some people that they give up the idea, and therefore all the potentials of visual communication are lost.

The inability of seen form, the lack of knowledge of materials and equipment, a nervous hand, a ripping palm often force the individual to give up. Except for the few who have the advantage of training in drawing, or have access to art services, creating the visual image will be one of the most serious problems in developing materials. In recent years great advancement has been made to help those who are not adept with creating their own graphs, diagrams, maps and illustrations. Not only do these new materials help the inexperienced person, but they also speed production for the professional artist. Knowledge of old reproduction techniques and newly developed reproduction techniques of instructional materials and equipment will expand tremendously the potential of the non artist in developing visual imagery. It is therefore, very important for the instructor

to keep abreast with the many production aids available for the process of easy visual transfer (Eastman, 1971).

Hundreds of drawing templates are being produced to facilitate the drawing of symbols of various kinds. Drafting tapes in a wide variety of sizes and patterns help to simplify the visualizer's problems. A large assortment of shading sheets is available to short-cut the monotonous drawing of repetitive patterns and the individual to obtain repetitive silhouette images for use on graphs and charts.

Large assortments of prepared art for paste-up are appearing in the form of sheets and booklets and may be subscribed to as one would in a magazine to ensure an unending flow of new and varied drawing and illustrations. It is the knowledge and use of those art aids that is vitally important to those interested in developing their own presentation materials. The greater the knowledge one has of these visual means of expression, the more flexible one will be in expressing an idea (Nestrand, 2001).

2.7.3 Graphics Quality and Instructional Materials

Obaseki (2010) asserts that the dynamics of good quality production lies in good graphic design and understanding of colour combination with other major ingredients for excellence in print production of visual instructional materials. Pre-production operations must be thorough to achieve optimal quality out-put (Bosu, 2001).

2.7.3.1 Carbon Transfer Techniques

A common technique for making a visual transfer is the use of pencil carbon with the visual's drawing face down on a clean, smooth working surface. The procedure is to apply a heavy layer of soft pencil lead to the image lines of the visual. Be sure all lines

are completely covered with lead. Turn the visual over, and tape the surface on which the transfer is to be made. Using a stylus, pencil, or ball-point pen, carefully trace over the lines of the visual. Be careful not to use too much pressure, because this will leave an indentation on the transfer.

As the drawing instrument traces over the drawing, the pencil carbon on the back of the drawing will be transferred. When all lines have been traced, carefully lift one corner of the drawing to check the quality of the transfer. To ensure requisition, if required (repeating lines not transferred as desired), simply lower the drawing back down on the surface. If the transfer is satisfactory, remove the original and complete the transferred drawing in whatever medium desired. Although this techniques works quite well, there is tendency for extraneous carbon to rub off, causing smudges on the final drawing (Shaw, Amiel, 2003).

2.7.3.2 Grid Drawing Transfer Techniques

An easy way to reduce and enlarge existing drawing, symbols, letters and so forth is by the squaring method. In effect, the original image is sub-divided through a grid pattern into smaller, less complex areas. This enables a person with little or no drawing experience to reproduce the small squared sections of the drawing, one at a time and, upon its completion, have effectively reproduced a rather complex image in any size desired from a direct reproduction to one either smaller or larger than the original (Adesoye, 2009).

The squaring process is to lay out a square grid pattern over the image to be reproduced. The size of the squares will be determined by the complexity of the original

as well as the experience of the artist, light pencil lines for the grid will make it easier to follow the lines of the image. A grid of the desired proportion is next drawn on the surface on which the drawings to be made of grid lines are erased after the drawing is completed. This may serve as the final product. However even if it is desirable to trace the finished drawing on to some other surface, tracing paper will serve as a good intermediate material upon which to place the drawing. If squared graph paper of the desired size can be obtained, the drawing of an original grid will be eliminated (Dorothy and Smith, 1985).

2.7.4 Colouring Techniques

The application of colouring or shading in one form of another adds an exciting dimension to visual instructional materials. The tested colouring and shading techniques which make possible the application of colouring or shading to practically all types of instructional materials will be discussed (Obaseki 2010).

Visual instructional materials which may require colour or shading, or whose visual effectiveness may be enhanced by those techniques include: charts, graphs, maps, diagrams, posters, illustration, photograph, slides, titles, overhead projection, transparencies, power-point and duplication materials. Each of the colouring and shading techniques included in this section has certain characteristics which may limit its application to specific types of instructional material. These characteristics will be brought out in the treatment of each technique. It cannot be over emphasized that colour or shading should not be used mainly for the sake of adding colour or shading to an instructional material. Moreover, colour or shading can be over used and can therefore lower the quality of the instructional material (Akolo, 1986).

Colours and shading ideas taken from magazines, newspapers, brochures, posters, commercial, transparencies, and other printed materials, can provide answer to colouring and shading problems (Anonymous, 2007).

2.7.4.1 Colour Pencils, Pens and Markers

Many methods can be used to add colour to a visual. It is extremely important to study the characteristics of the colour ingredient used since the terms paste, chalk, crayon, and pencil are all interrelated and rather difficult to define. Through experimentation one must finalize which colour characteristics work best for a particular situation. Poster colours, chalk, crayons and pencils vary from soft to very firm, permitting the artist to execute a range of effects for boards, flat surfaces, and sharp detailed drawing. When soft pastels, chalks, pen or pencils are used on posters, charts and the like, the danger of the image smearing is inevitable. Consequently a method of production must be devised either by conversing with an acetate sheet, laminating it, or spraying it with some form of acrylic spray of fixative. Colour pencils available in a large range of colour may be used on acetate. When the drawing is completed, the surface must be sprayed with acrylic lacquer or a similar material to it transparent. This will make the image to be projectable in colour: Not all colours will project equally and so it is advisable to choose the colours that work best (Belser, 1977).

Fine-and medium-lipped markers may be purchased for use on transparencies in a variety of brilliant dyes and inks. Some are waterproof, and some may be removed with water, some may simply be wiped off, while others require special solvent for removal. The felt-tipped pen of marker is very similar to markers and is commonly used for making both opaque materials and transparencies. Some contain transparent water colour

are valuable for tinting photographic transparencies such as are produced by the high-contrast method. Some felt markers may be refilled, and they have a choice of interchangeable tips. The variety and possible use of pencils, pastels, chalks, felt markers, and so forth, are so great that only by experimenting will a person be able to choose the most desirable for the particular need (Shaw and Aniel, 2003).

2.7.4.2 Manual Techniques (using assorted colours)

Transparent water-colours in their many brilliant hues have a variety of uses in the production of visual media. They may be purchased in both liquid and dry states. Liquid water colour may be obtained in concentrated and diluted form in a number of sizes. Felt point markers containing transparent water colours are available. The colours are brilliant but limited in shade selection. The feature of the felt points is its ease in use and storage.

It is important to permit plenty of time for the water colour to completely penetrate the emulsion. The colour must be kept constantly from flowing to prevent dry spots from forming. When drying takes place, absorption is stopped. Transparent water colours may be obtained in booklet form. A high concentration of dry colours is adhered to paper pages. When the paper is placed in water, a clear, brilliant liquid colour is produced. The depth of this colour is determined by the amount of water used. The art of water-colouring demands extensive use of instructions and practice on part of the designer in order to produce a masterpiece. However, by following a few simple instructions, the novice can make excellent use of transparent water-colours in the preparation of materials. This is especially true when one is working on treated surfaces

such as the emulsion found on photographic films and papers. The colour may be applied with either a regular water-colour brush or a cotton application.

If large areas on transparent or opaque surfaces have to be tinted in solid or graduated colour, the use of the airbrush or transparent colour in aerosol cans will greatly facilitate the process. First, mask the areas around the section of the film to be tinted. Allow the masking liquid to thoroughly get absorbed with a cotton applicator or brush, flood the unmasked area with generous amounts of liquid water colour.

It is important to allow plenty of time for the water colour to completely penetrate the emulsion. The colour must be kept constantly moving to prevent dry spots from forming. When drying takes place, absorption is stopped and irregular tinting results. Complete saturation of the emulsion ensures an even tint over the entire area. As an alternative, a tinted rubber cement mask may be applied around the image to be coloured and open all other areas to be protected from the spray. When the rubber cement has thoroughly dried, spray on an even coating of the desired water colours, if a smooth, soil area of colour is desired, be sure to flood the area slightly with colour; place the spraying image on a dry clean, level surface, in a short time the colour would have dried. Remove the rubber cement gently rolling it off with the tip of the finger (Belser, 1977).

2.8 Computer Graphics Input

Computers are now being used to produce visual instructional material such as camera-ready art works, charts, graphs, cartoons, flexes, illustrations and so forth. Computer graphics systems offer many advantages beyond traditional methods of production. These advantages include:

1. **Increased speed of production.**

Generating a typical word slide, power point (a few lines of text on a coloured background) by conventional graphic techniques requires such intermediate steps as typesetting, and paste-up, high-contract photography and color photography. The entire process can take several hours, depending on the procedures used and the complexity of the material or aids. Producing a word on graphics system eliminates almost all handiwork other than entering information through a keyboard or other impute devices; a process that typically takes a trained operator just a few minutes to execute.

2. **Ease of revision**

A computer generated visual is stored electronically. It takes only seconds to retrieve the stored information in the computer. One makes use of the keyboard, a mouse or other input device to make revisions simplified.

3. **Increased emphasis on design**.

Because the colour, size, or style of the elements within a computer-generated visual can be altered rapidly, a computer graphics operator is able to explore alternative layouts before selecting the final design.

4. **Greater Sophistication of images**

Complex images can be created to appear in true perspective, as mirror images and as three dimensional images, all with an array of vivid colours. From

one visual to the next in a series text can be moved, overlays added, colours changed and special effects used, all of which can have storage visual impact.

Computers and other productions of technology are introduced to do three major things: (i) save time, (ii) cost effective and (iii) improve quality. This is the view of experts in the design and prints industry.

2.9 Design of Visual instructional Materials

In the present computer age, most farmers in the North-west zone of Nigeria are still involved with traditions farming methods and low yielding seed varieties (Atala, 1986). Therefore the design and production of visual instructional materials can enhance information dissemination and improve knowledge of modern farming techniques. The designing of visual instructional materials for agricultural extension was guided by design principles and elements, which during the process attention was given to factors such as the serving objectives for flexibility and integration with other desired impact. Obaseki (2010).

Within this research work, the ordinary farmer should not be classified as traditionalist and unmotivated to accept new ideas through the impact of extension agents, agency and visual instructional materials in the zone. But their traditional and indigenous practices should carry new innovations in agriculture. The ultimate goal, of course, is to achieve agricultural and rural development (Atala, 1986).

Visual instructional materials role and impact approach can be justified from Roger's diffusion of innovation prospective to social change and development. Rogers (1983) considers change agents as individuals who influence clients' behavior and serve

as a linkage between the change agency and the client system. However, the success of agents depends on, among other things, the change agent's effort to contacting clients, compatibility of extension programmes with clients' needs, empathy with clients and their credibility (Rogers, 1983).

To increase farmers' adoption rate for agricultural technologies, an important strategy would be through an effective communication (extension) system. The important role of the communication system in development has been asserted in the social, psychological perspective of social change and development (Hagen 1978). No change in society can take place without communication other than in the case of natural disasters.

Communication is indispensable to every attempt to bring about change. The crucial importance of development communication in rural areas necessarily puts the role and impact of extension visual instructional materials in a critical position for much attention.

2.10 Role Impact of Instructional Materials

Role impact is the dependent variable in this study. Impact can be defined more broadly than goal attainment as long-term influence on the state of the environment surrounding the organization (Clark, 1986). It is important that programme evaluation should give appropriate attention to the efficiency with which goals are achieved. Role performance is role impact which, according to Belser 1977), is synonymous with "end results," "ultimate outcomes," or "ultimate impact".

Generally, impact is interchangeably described as outcomes, results, effects (or effectiveness), outputs, and consequences. In most cases, an instructional materials can be viewed as effective (or ineffective) to some degree in terms of its efforts to meet multiple and certain conflicting constraints, goals, constituents, and time frames (Hagen, 1978).

Measurement of impact can be done objectively or subjectively or both. An objective measure of visuals' role impact commonly used in adoption diffusion studies is measure of adoption rates for new technologies in agricultural extension delivery. Subjective measures have also been used in studies of extension impacts by analyzing the perception of farmers regarding given services. A perception of impact study is one means of demonstrating the quality of services provided by the organization. Perception of impact studies are designed to provide an organization with feedback from appropriate publics on its performance in fulfilling their needs.

2.11 Role Theory of Visual Instructions Materials

Role theory has frequently been used as a framework for explaining individual, instructional and organizational roles and effectiveness (Akinbode, 1971). The focal point is the particular position being studied, while the counter position is the position to which the role of the focal point relates. In this study, for example, the field extension agents and visual instructional materials represent the focal point, while the farmers represent the counter positions in this case.

The basic notion of role theory, however, is that in any organization, every individual occupies a position which assumes certain given roles which are expected to

be performed by the incumbent of a given position. The theory is multi-dimensional, comprised of various components like status position, role expectation, role perception, role consensus, role performance, role conflict, and role consequences or role impact.

According to Biddle (1979), role theory is a science concerned with the study of behaviours that are characteristic of persons within contexts and within various processes that presumably produce, explain, or are affected by those behaviours. For example, extension agents have learned expectations for the appropriateness of their behavior or extension activities, farmers, and the society.

Finally, the role concept is also explained in terms of the socialization and adjustment of the individual to new ideas and change.

2.12 Model of Role Impact in Extension Services

Role and organizational theories offer some important leads for explaining the role and role impact of extension visual instructional materials usage in the north-west zone. The two theories set out several concepts and variables which are presumably important to role and role impact.

The heuristic model for identifying bivariate and causal relationships in the research starts from extension agent characteristics (age, education, training, job tenure, rank, job satisfaction, and attitude), organizational factors (decision making, planning, and personnel policies), role perception, role consensus, role performance and role impact, as illustrated in the figures below.

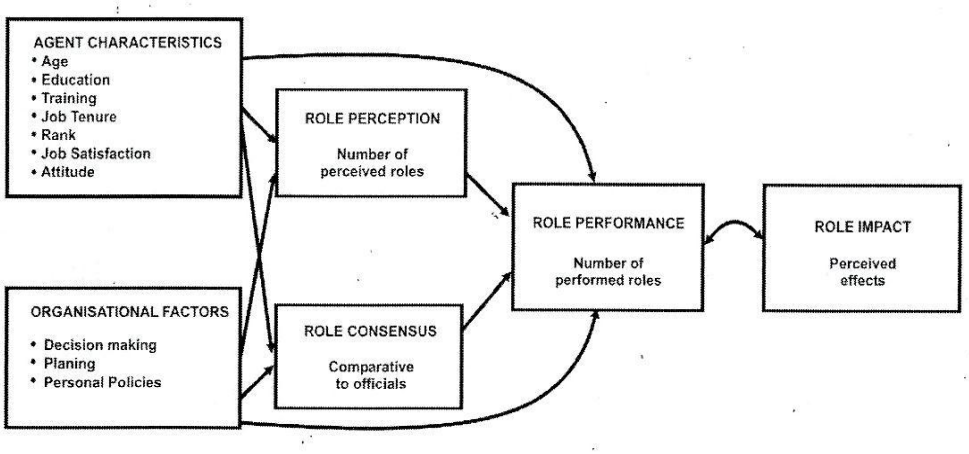


Figure 1: A heuristic model of role impact. Source: Atala (1986).

In this model, agent characteristics are posited to affect role perception, role performance, and role consensus in disseminating agricultural information messages to farmers. Organizational factors are posited as affecting role perception, role performance, and role consensus of the agricultural extension agents as link between agricultural technology and the farmers. Role perception is deemed to affect role consensus and role performance of the farmer or the extension agent. Role consensus should be important for role performance that positively affects the agricultural extension and farming systems in the North-West zone. Finally, role performance is believed to directly affect role impact predominantly in the farming system in North-West agro-ecology of Nigeria.

For the purpose of clarification, a heuristic model is a figurative representation of a perceived object used to guide one in pursuit of its knowledge. It provides a perspective that permits an ordered perception of the empirical world, and it is a directing scheme for theory construction and further investigation. Thus, it can be neither "true" nor "false," only serviceable and adequate to varying degrees, for its cognitive productivity.

2.13 Review of Variables in the Model

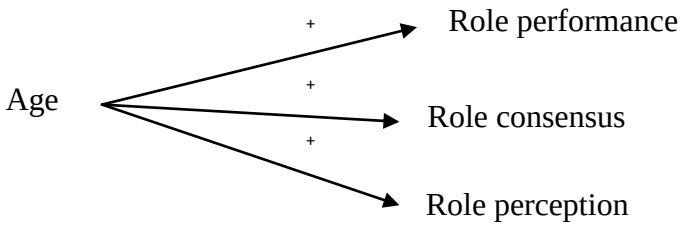
1. Agent Characteristics, Consensus and Perception

The agent characteristics will include age, education, training, job tenure, rank, job satisfaction and attitudes. As organizational participants, extension agents are those individuals who make contributions to the agricultural extension organization in return for a variety of inducements. The extent and intensiveness of their involvement vary greatly; participants also vary more in the level of skills or expertise they bring to the organization.

2. Age and Role Performance, Consensus and Perception

In an organizational setting, age of a participant tends to be associated with status position, which also tends to be associated with a variety of multiple responsibilities and degrees of sense of responsibility. Persons with various responsibilities would tend to perform many responsibilities. It would be expected that age and its enhancement of one's range of duties and sense of responsibility would be correlated with the number of responsibilities performed. Thus, older employees are more likely to perform more or most of their role expectations or duties than younger ones.

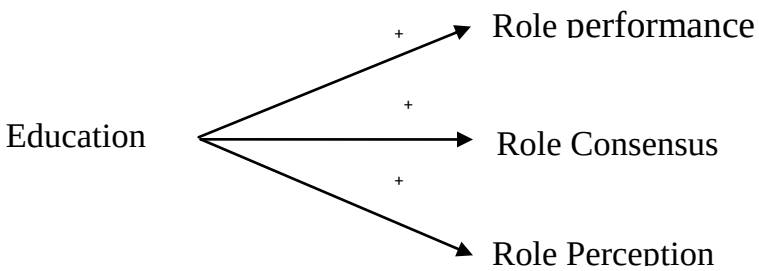
The specific relationships anticipated between agents' ages and their role performance, role consensus, and role perception are summarized schematically below.



(3) **Education and Role Performance, Consensus and Perception**

Education refers to formal knowledge acquisition or schooling. The level of educational attainment is frequently represented by the number of years of formal education. In the Nigerian extension system in the North-west zone, it is therefore, lamentable that the village level extension agent who provides the closest contact with producers and does the bulk of the "convincing" in usage of visual instructional materials to farmers, is the least educated, and the least trained in the system (Atala, 1986).

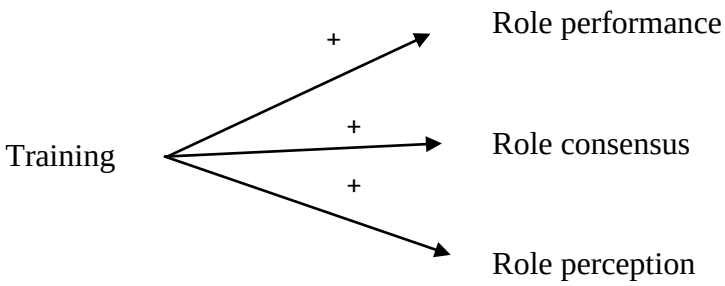
The anticipated relationships between agents' educational attainment and their role performance, role consensus, and role perception are presented below.



(4) **Training and Role Performance, Consensus and Perception**

Training is a programme in which participants acquire new knowledge and skills. People bring to their jobs their individual assortments of previously learned skills, knowledge, interests, motivation, and attitudes. The additional learning people acquire after they become employees can take place either through on-the-job experience or through training. Training has been identified as a major factor in Agricultural Extension services. The inadequate or lack of training is frequently suggested as one of the major reasons for the ineffectiveness of extension agent's, Abalu (1979). The anticipated

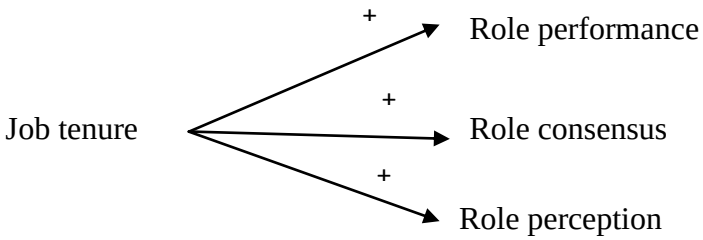
relationship between training and agent's role performance, role consensus, and role perception are presented below:



(5) **Job tenure and Role Performance, Consensus and Perception**

Experience and skill in the usage of visual instructional materials in agricultural extension services go with length of practice or job tenure. Persons who have been on the job longer would have a acquired more experience and skills to perform various organizational responsibilities than the new employees. The opportunity to perform various duties in different capacities comes with time. Also, assignment of job responsibilities takes experience and ability into account. In this study, it is hypothesized that extension agents' year of service are positively related to their role performance.

Individuals with many years on their job would have much knowledge of the goals and functions of their organizations. It is hypothesized here that agents' years of work with extension visual instructional materials are positively related to their role consensus and to their perception of extension roles. The anticipated relationships between job tenure and role performance, role consensus, and role perception are presented below:

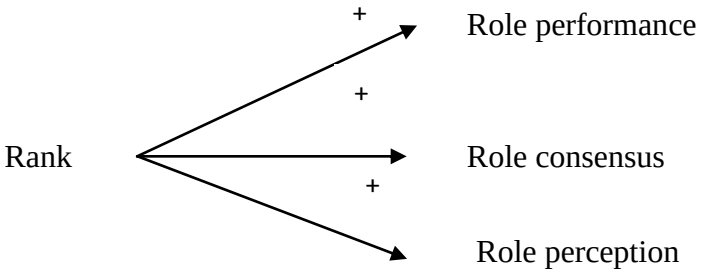


(6) **Rank and Role Performance, Consensus and Perception**

Rank is the individual's position or status in an organization. Generally, organizational participants are hierarchically ranked. In formal organizations, participants are ranked as lower – ranking, middle-ranking, and higher-ranking persons (Zey-Ferrell, 1979).

Rank has been found to influence extension agents' job performance. It is hypothesized here that agents' rank are related positively with their performance, consensus and perception of their roles.

The anticipated relationships between rank and role performance, role consensus, and role perception are presented below.

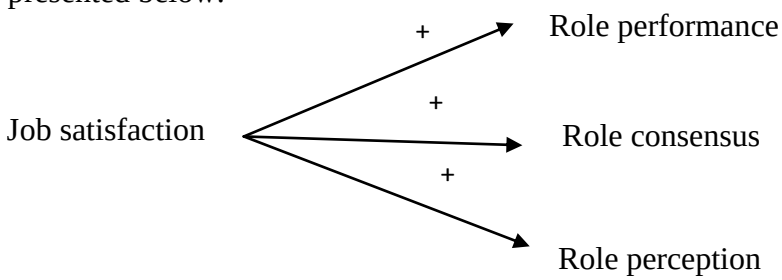


(7) **Job Satisfaction and Role Performance, role Consensus and Role Perception**

Job satisfaction has been considered as a dependent variable in agricultural extension studies. Kincaid (1986) found that senior level staff were more satisfied with

their jobs than junior level staff and that extension agents in the north-western parts of Nigeria were more satisfied with their terms of employment. The factors that contributed to the lack of job satisfaction among extension agents as identified by the agents themselves are slow promotion on the job, lack of adequate transportation, lack of essential office equipment and field demonstration tools and visual instructional materials, and inadequate supply of inputs for the farmers.

In this study, it is hypothesized that the extent of job satisfaction of agents is positively related to their role performance, role consensus and role perception. The anticipated relationships between job satisfaction and role performance, role consensus, and role perception are presented below:



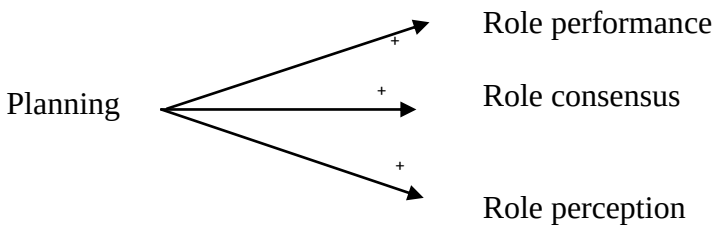
(8) **Planning and Role Performance, Role Consensus, and Role Perception**

Programme planning is a schematic design and systematic implementation of policy decisions in terms of programme and activities. The task of implementing a programme can be effectively accomplished through the use of plans because the complexities can be controlled and much of the future interactions can be programmed (Wallace, 1983).

Inadequacies in planning agricultural extension instructional materials usage programmes have been found to be a serious problem in extension services, Akinbode (1977). Relatively minor delays can have the effect not simply of reducing output but of

rendering programmes wholly abortive. To be successful, programmes and activities have to be carried out at the appropriate times, following the plan for utilization of resources when implementing a programme in the field.

The anticipated relationships between planning and role performance, role consensus, and role perception are presented below:



(9) **Role Perception**

Role perception can be defined as a set of expectations a person in a focal position holds for his or her own behavior towards visual instructional materials.

Role perception could be considered as the individual understanding of the role of a given position. Therefore different individuals can have different perceptions of the behaviours associated with a given role (Onazi, 1986and Atala, 1986).

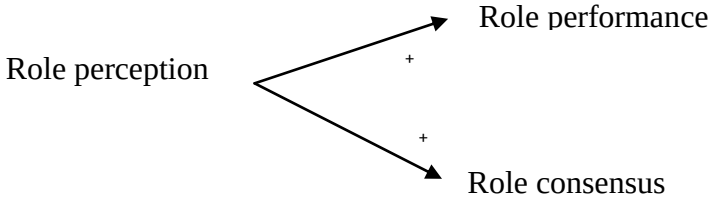
10. **Role perception and Role Performance**

Role perception influences role performance. Individuals' perceptions of their roles are bound to affect the kinds of activities they perform as their roles and the manner in which they perform these activities.

It is important to point out, however, that agricultural extension agents' usage of visual instructional materials role perceptions may not necessarily translate into

performance of the perceived roles because of intervening factors such as insufficient resources or inadequate incentives to accomplish what next to be done. However, according to Warner (1972), perceptions, attitudes, and experiences of programme participants provide an important assessment of extension materials performance.

These observations and studies point in the direction of a positive relationship between role perception and role performance. In this study, it is hypothesized that agents' role perceptions are related positively to their role performance, and agents' role perceptions are related positively to their role consensus. The anticipated relationships between role perception and role performance and role consensus are presented below:



11. **Role Consensus and Role Performance**

In this study role consensus is the degree of agricultural extension agent's agreement with official ratings of the importance of duties and responsibilities in relationship to the usage of visual instructional extension materials.

Variability in behavior has been accounted for by invoking such variables as different motivations, attitudes, or personality characteristics (Atala, 1986). Empirically, however, there are degrees of consensus on the expectations which can be inferred from the percentage of respondents or role definers who agree on the expectations. Hence, it is

hypothesized in the present study that agents role consensus in usage of agricultural extension visual instructional materials is related positively to their role performance.

The anticipated relationship between role consensus and role performance is presented as follows:

Role consensus $\xrightarrow{+}$ Role performance.

12 **Role Performance and role impact**

Performance is defined as activity which produces an outcome Role performance would, therefore be conceived as activities of an incumbent of a given position which are aimed at producing certain desired outcomes or impact.

According to Wang (1983), when the role of extension is fulfilled, there would be "results," "achievements" "accomplishment," "effects," or consequences of agricultural extension services.

Impact of perform roles can be affected by several other factors such that the desired or specified outcomes might not be attained. Where there seems to be not much correspondence between perform role activities and expected or specified impacts, the performed role activities would tend to have only tangential impacts. For example, dissemination of agricultural extension services information in the rural areas might have only indirect and low effect on rural farmers. It is hypothesized in this study that extension agent usage of visual instructional materials role performance is related positively to their role impact.

The expected relationship between role performance and role impact is presented as follows:

Role performance ⟶ perceived role impact.

+

2.14 Hypotheses of the Model

The role and organizational theories serve as the basis for the heuristic model of role impact. The expected relationships in the model, which were derived from the theoretical and empirical literature on agricultural extension services and graphic design, are listed below. The listing is organized according to the specific dependent variables which are being tested.

1. Hypothesis linking the independent variable to role impact. Role performance of the extension agent's usage of visual instructional materials is related positively to perceived role impact.

2. Hypotheses linking the independent variable to the role performance. Age, education, training job tenure, rank. And job satisfaction of an extension agent is related positively to role performance.

3. Hypotheses linking the independent variables to role consensus of extension agent's ability to understand visual instructional materials are related positively to role consensus.

4. Hypotheses linking the independent variables to role perception of planning, decision making and attitude towards framers and rural life are related positively to role perception.

2.15 Graphic visuals in communication for Agricultural Development

The importance of graphic visuals in communication for Agricultural Extension is of tremendous value. Communication, especially extension and agricultural information and group levels has its importance and advantages. Communicating, in agricultural terms, entails passing of related agricultural information to and between the stake-holders including farmers, extension and agricultural researcher. However, agricultural extension communication, in the context of development, is specifically targeted toward improving the livelihoods of the participants (the farmers and extension agents) through the process of exchanging agricultural information between themselves and others (Ndahi 2004; FAO, 2003 and Dominick, 1987).

The adoption of recommended technologies and packages could be attributed to the effectiveness of the communication methods, channels and techniques. The limitations and constraints in the traditional and formal communication channels have made graphic visuals application more relevant. Consequently, because of its vivid impact, a more satisfactory and useful mechanism for innovation in communication in agricultural context is desirable (Omotayo, 2005 and FAO, 1985).

For instance, Leeuwis and Van den Ban (2004), Fadiji (2007) documented an extensive work on communication for innovation looking at the changing perspectives and the organizational and inter-organizational issues involved. Specific to the media methods, and process management, the work outlined related to farm management, pre-defined issues, exploration and training. Their work went further to examine methods

related to information provision with discussion on written and computer-based search and access facilities as well as information-needs assessment.

According to Van dan Ban and Hawkins (1993), diffusion process (i.e. the stages between when the farmer hears about favourable innovations and the time he adopts them), takes the following stages namely: (1) Awareness (2) Interest or information (3) Evaluation or application (4) Trial, and (5) Adoption.

Otolo (2008) found out that the extension agent constituted (38.42%) of farmers' source of information on innovations and development in agricultural sector, followed by the media (34.21%). In addition, the findings further showed 99.9% positive effect of communication on rural farmers.

Kosakowski (2009) noted the following being the factors observed in successful technology-rich schools:

- Evidence of a detailed technology plan.
- Teacher training and continuing education.
- Support from administration
- Support from the community members.
- Support from government.
- Adequate funding and appropriate policy making can help to ensure that technology is accessible to all schools on an equal basis.

In summary, it was concluded that these factors suggest that for technology to succeed, like any educational tool, it cannot exist in isolation, but must be made an integral part of the entire instructional process (Umar, 2005 and Ogunbameru, 2006).

2.16 Theoretical Framework

2.16.0 Introduction

The theoretical frame work employed in this study is the Role theory and impact in social behavior. Impact on behavior is a process by which alternations occur in the life styles of human groups. Role impact may be planned or unplanned and pervades all aspect of social life and may manifest as economic, political, technological, cultural and behavioural changes (Ekong, 2003). The Role Theory is applicable to this study because evaluating instructional materials roles in agricultural extension activities across the North-West zone is critical in agricultural production in Nigeria (Otolo, 2008).

2.16.1 Role Theory

The theory is multi-dimensional with various components like role expectation, role perception, role performance and role consequences or role impact. According to Biddle (2002), role theory is a science concerned with reevaluating behaviours, characteristics, impacts, within contexts and within various processes that presumably produce, explain or are affected by those behaviours. For example, agricultural extension agents' usage of visual instructional materials, farmers and the society or general public expected impact.

The study therefore presents an evaluation of visual instructional materials usage by agricultural extension agents and farmers to bring about improvement and efficiency in their work, job performance and in agricultural production.

2.16.2 Model for this study

The model illustrates relationship between causal, intervening and output variables provided by Oyejola (2003) and Atala (1986). This study derived inspiration from the model, however, with slight modification and application Figure 1 illustrates the conceptual Framework upon which this study was based. It depicts the factors, characteristics and perception of Agricultural Extension Agents and farmers influenced by the resultant usage of visual instructional materials (Oyejola, 2003).

2.16.3 Independent Variables

The first column in figure 2 contains the independent variables, they are agricultural extension agents and farmers characteristics and perception of visual instructional materials. Osuala (1987) defines a variable as numerals or values assigned, justifiable set values for score on an intelligence test or an attitude scale. He further categorizes variables into three, namely; (1) independent and dependent variables, (2) Active and attribute variables, and (3) continuous and categorical variables.

In this context, these characteristics/perceptions theoretically are expected to influence the usage of visual instructional materials. Thus, the independent variables are expected to predict the dependent variables.

2.16.4 Dependent variables

The second column in (Figure 2) indicates the dependent variables which are the visual materials used by agricultural extension agents and farmers. They are selected visual instructional materials in this study; the general concept is that the factors arising from the agent's and farmer's characteristics and perception of visual instructional materials usage in relation to educational background and training are expected to influence the dependent variables.

2.16.5 Identity of visual instructional materials

The third column in (Figure 2) depicts the identity of visual instructional materials. It indicates the resultant behavior in terms of:

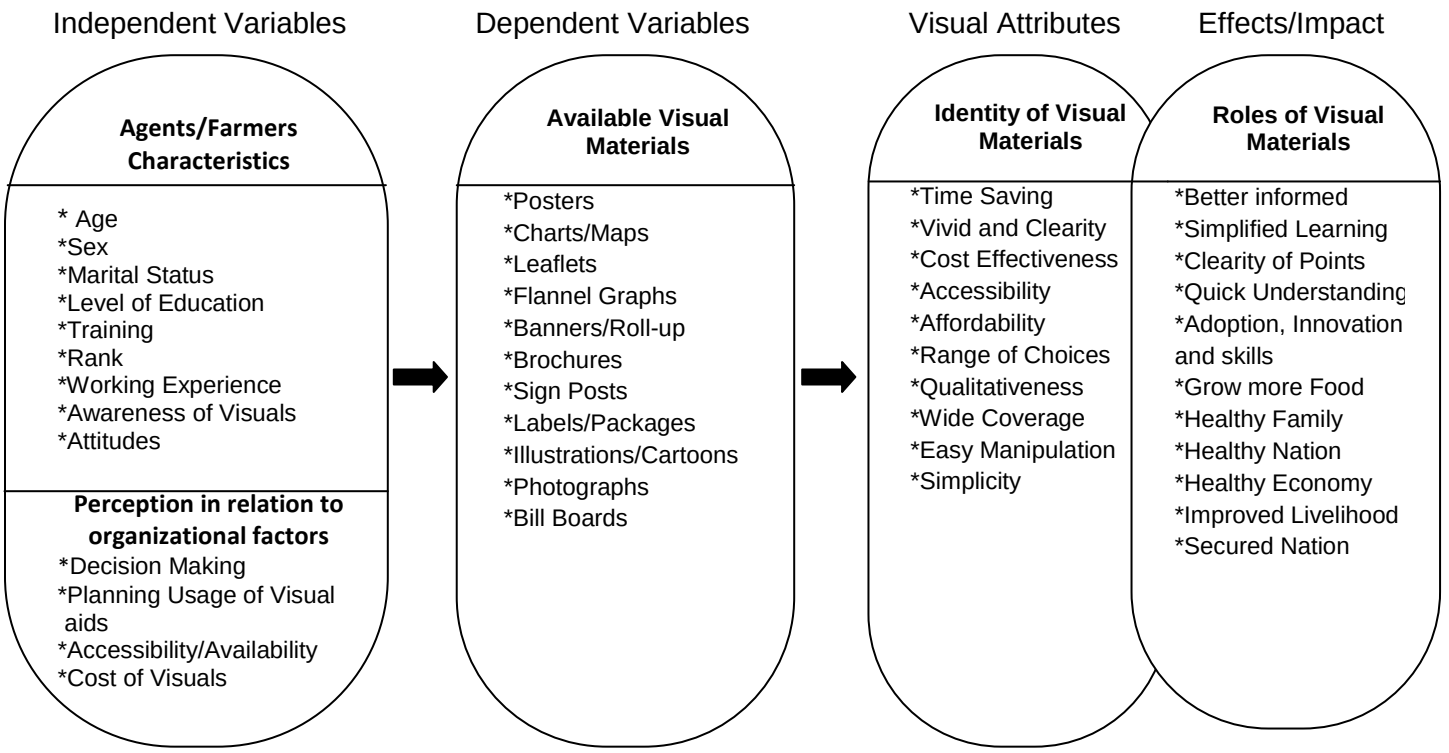
(1) Time saving, (2) Vividness and clarity, (3) Cost effectiveness

(4) Accessibility (5) Range of choices, (6) Wider coverage (7) Easy manipulation (8) Good quality and (9) Simplicity.

2.16.6 Effects/Impact of visual instructional materials

The fourth column in (Figure 2) depicts the resultant roles, affects and impacts of visual instructional materials usage in agricultural extension services on users in terms of disseminated messages. The farmers are better informed, learning processes simplified, points are received with clarity, quick understanding, adaptation of new innovations and skills, grow more food, healthy family, healthy nation, healthy economy, improved livelihood, secures nation and general value addition.

Figure 2: Variable influencing usage of visual instructional materials and roles impact



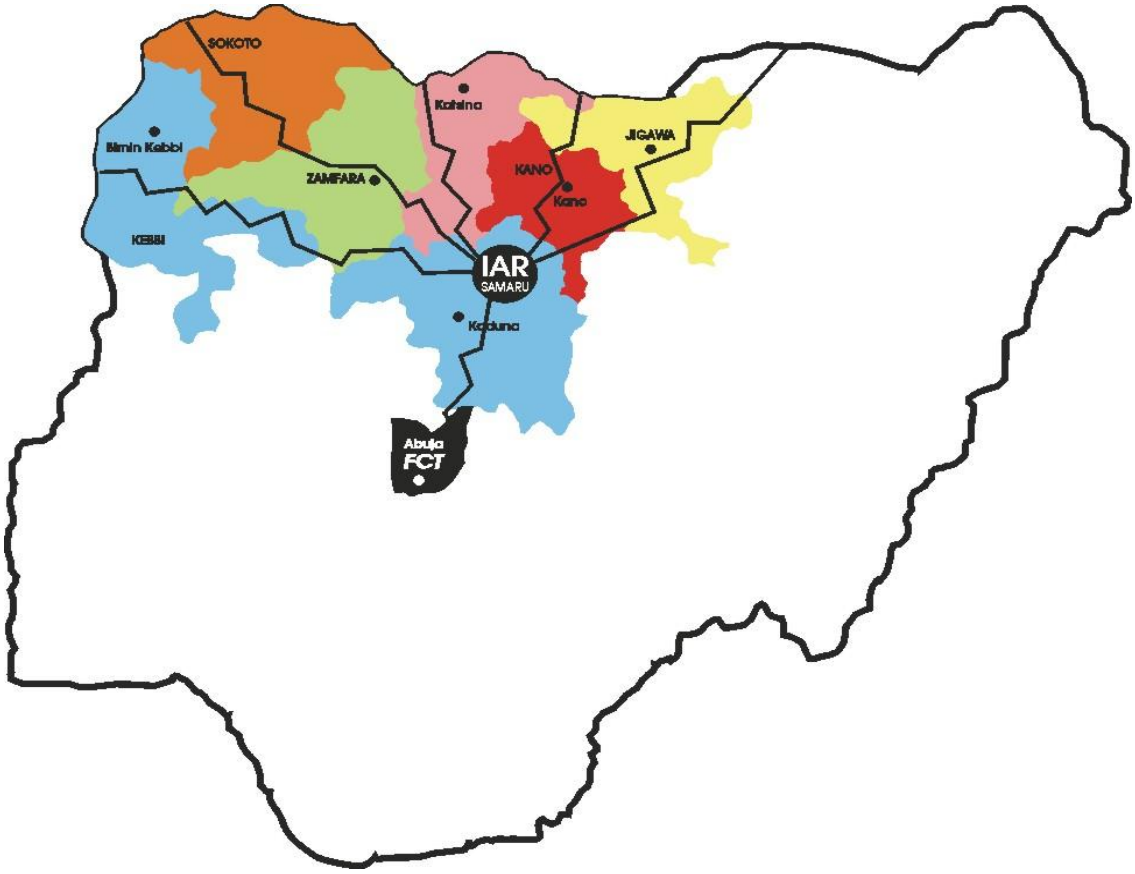
Source: Research Findings

CHAPTER III MATERIALS AND METHODS

3.1 The Study Area

This research focused on visual instructional materials usage in agricultural extension activities among the extension agents and farmers of the Agricultural Development Programmes (ADPs) in Jigawa, Kaduna, Kano, Kebbi, Katsina, Sokoto and Zamfara States of the North-West Geo-political zone of Nigeria

Figure 3: Map of Nigeria Showing the Study Area



Source IAR, ABU, Zaria, 1989.

3.2 The Climate and People

The North-West Agricultural Zone of Nigeria lies between latitudes 9^{o}N and longitudes 14^{o}N (Kowal and Knabe, 1973). The mean annual rainfall ranges from 500mm to 1200mm falling for about 3-5 months in a year during which the crops are grown. It has an expanse of land area of about 192,911 km^2 (Shaib, *et al* 1997).

The North-West Agro-ecological Zone has a combined population of about 35.8 million (National population Census, 2006), 80% of which lives in the rural areas. The ethnic groups found in the zone are the Hausa, Fulani, Kaje, Kataf, Bagi and Zuru. The zone has two major river basins namely, Sokoto and Hadejia – Jam'are (Anonymous, 2009).

The Zone has arable land classified into upland (Gona) and bottom land/lawland (Fadama) used for both rain-fed and irrigated agricultural practices respectively. The major crops produced in the zone include: maize, sorghum, cowpea, groundnut, rice, cotton, wheat, tomato and pepper. The Zone is reputed for production of cattle, goats, sheep, poultry, rabbits, pigs, camels, sheep, horses and donkeys. The major rivers of the zone (the Rima, Kano, Hadejia and Kaduna) and their tributaries as well as reservoirs and lakes provide opportunity for fishery (USAID, 2009 and FAO, 2002).

3.3 Population of the study

The exact number of the population as at the time of the study is not certain. However extension journal of agriculture (2012) has estimated a ratio of 1 extension agent to 1,500 farmers. There were an estimated number of 3,500 extension agents in the

zone. It could be draw therefore that the estimated number of farmers in the zone is approximately 5,250,000 in the zone.

3.4 Sampling Technique and Sample Size

The random sampling technique was used for the selection of samples for the study. The samples for both respondent farmers and extension agents were collected during the regular quarterly meetings organized by the institute for agricultural research, Samaru. This was considered an appropriate way to locate valid respondents from the sample frame. A total number of respondents were thus 56 agricultural extension agents, 8 from each state and 14 respondent farmers, 2 from each state.

3.5 Method of data collection

The main instrument used for gathering the data for this study was questionnaire administered to extension agents and farmers who were randomly selected from the ADPs of the seven states. The questionnaires were scrutinized by the three research supervisors for face and content validity after which all the necessary observations were considered and adjustments made. The questionnaires were further examined by a professor of statistics and then they were subjected to pre-tests. The results of the pre-tests revealed that some of the closed ended questions on visual instructional materials were too restrictive and had to be given more options for response. The questionnaires were therefore considered valid and reliable for the data collection. Questioners were personally administered to all the respondents.

Interview was also used in the study for data collection. Specifically, structured interview was used to collect data from the respondents farmers with regards to the visual

instructional materials presented. The main questions for the interview covered language preference in communication through the various media presented.

3.6 Analytical Technique

Both descriptive and inferential statistical tools were employed for the data analyses. Pearson Chi-square test procedure was employed for all the Hypotheses within the tests presented. All the hypotheses was tested on the usage roles and adoption of visual instructional materials at 0.05 level of significance. The data collected through interview were subjected to contents analysis.

CHAPTER IV. DATA ANALYSIS AND DISCUSSION OF FINDINGS

This chapter presents and discusses findings in relation to the specific objectives of the study.

4.1 Demographic Characteristics of the Users of Visual Instructional Materials.

From Table 1, 70% of the users of visual instructional materials in Agricultural Extension were male while 30% were female. In gender variation, male users were dominant. The study found out that 62% of the users were between the ages of 18-39 years. Those of ages 40-59 years constituted 34% while those within 60 years and above were 4%. The higher number of youths may be attributed to the fact that there is high rate of youth unemployment in Nigeria, and this observation agrees with Agbelmoge *et al* (2001) that youths are better adopters of new technology.

Table 1: Distribution of Respondents by Sex and Age

Variable	**Frequency**	**Percentage (%)**
Male	38	70
Female	14	30
Total	**52**	**100**
Variable	**Frequency**	**Percentage (%)**
(Years)		
18-39 (Youth)	20	62
40-59 (Middle)	15	34
60 & above (Old)	7	4
Total	**52**	**100**

4.2 Marital Status

The result presented in Table 2, shows that about 87% of the respondents were married, 12% being single and 1% being divorcees. This implies that people who are married due to their collective interest tend to work together to achieve a common goal. This agrees with Ekong (2003) that married couple work collectively in any technology adaptation that involve activities such as in agricultural extension and practices which may positively affect the quality of their lives.

Table 2: Marital Status of Respondents

Marital Status	Frequency	Percentage (%)
Married	39	87
Single	10	12
Divorced	3	1
Total	**52**	**100**

4.3 Educational Level

The result in table 3 shows the educational status of the respondents show that 12% had primary education, 24% had secondary education while majority (64%) had tertiary education. This implies that the levels of education and training have the capacity to relatively influence the role of information delivery through visual instructional materials in agricultural extension services. It could thus inferred that the higher the level of education, the greater the usage of visual instructional materials among the respondents.

Table 3: Distribution of Respondents by Level of Education

Variable	Frequency	Percentage (%)
Primary Education	4	12
Secondary Education	12	24
Tertiary Education	36	64
Total	**52**	**100**

4.4 Effect of language in understating visual instructional materials

Table 4 shows the distribution of participants by preferred language used in reading visual instructional materials. About 30.8% of the respondents preferred visual materials in Ajami (Arabic), 90.4% of the respondents Hausa Language while 92.3% preferred visual materials in English Language. This implies that English Language visual materials produced was much preferred with high acceptance among the three languages across the North-West Zone.

Table 4: Reading and Understanding visual Instructional Materials in Arabic (Ajami) Hausa and English.

Distribution of Respondents on Proficiency in Ajami (Arabic) Visuals Instructional Materials.

Response	Frequency	Percentage (%)
No Response	1	1.9
Fairly	4	7.7
Yes	16	30.8
No	31	59.6
Total	**52**	**100**

Distribution of Respondents on proficiency in Hausa Visual Instructional Materials

Response	Frequency	Percentage (%)
No Response	1	1.9
Fairly	1	1.9
Yes	47	90.4
No	3	5.8
Total	**52**	**100**

Distribution of Respondents on proficiency in English Visual Instructional Materials

Response	Frequency	Percentage (%)
No Response	1	1.9
Fairly	2	3.8
Yes	48	92.3
No	1	1.9
Total	**52**	**100**

Effective Language Preferred for Visual Instruction Materials

Response	Frequency	Percentage (%)
Ajami (Arabic)	5	9.5
Hausa	14	27.4
English	33	62.3
Others	0	0
Total	**52**	**100**

4.5 Effects of Illustration, Pictures and Colours in Visual Materials

From the result presented in Table 5, illustrations and pictorial materials have 78.8% level of effectiveness in designing visual instructional materials for agricultural messages while 86.5% of the respondents accepted usage of colours and only 13.5% did not care much about colours in visual designs for agricultural visual instructional materials. The result shows that illustrations, pictures and colour play a vital role when designing agricultural visuals for agricultural extension activities.

Table 5: Distribution of Respondents on the Effectiveness of Illustration, Pictures and Colours in Visual Instructional Materials.

Effectiveness of Illustrations/Pictures in Visual Instructional Materials

Variable	**Frequency**	**Percentage (%)**
Yes	41	78.8
No	1	1.9
Partially	10	19.2
Total	**52**	**100**

Effectiveness of Colours in Visual Materials

Variable	**Frequency**	**Percentage (%)**
No Response	7	13.5
Yes	45	86.5
Total	**52**	**100**

4.6 Visual Instructional Materials Usage and Effectiveness in Adoption of new Ideas.

Table 6 shows that the distribution of respondents who found the usage of visual instructional materials in agricultural activities as very effective ranking 50% and effective 38.5%, while in training and other specially organized programmes level of effectiveness at 61.5% and farmers adoption of new ideas 82.7%. The result shows that usage of visual instructional material in agricultural extension was highly effective and farmer's adoption of new technological ideas increased considerably high across the states in the North-West Zone of Nigeria. That is, improved farm practices in crops livestock and agro-forestry.

Table 6: **Distribution on Usage of Visual Materials and Adoption of New Technologies.**

Effectiveness of visual instructional materials usage in Agricultural Extension activities

Variable	**Frequency**	**Percentage (%)**
Very Effective	26	50
Effective	10	38.5
Fairly Effective	2	3.8
No Idea	4	7.7
Total	**52**	**100**

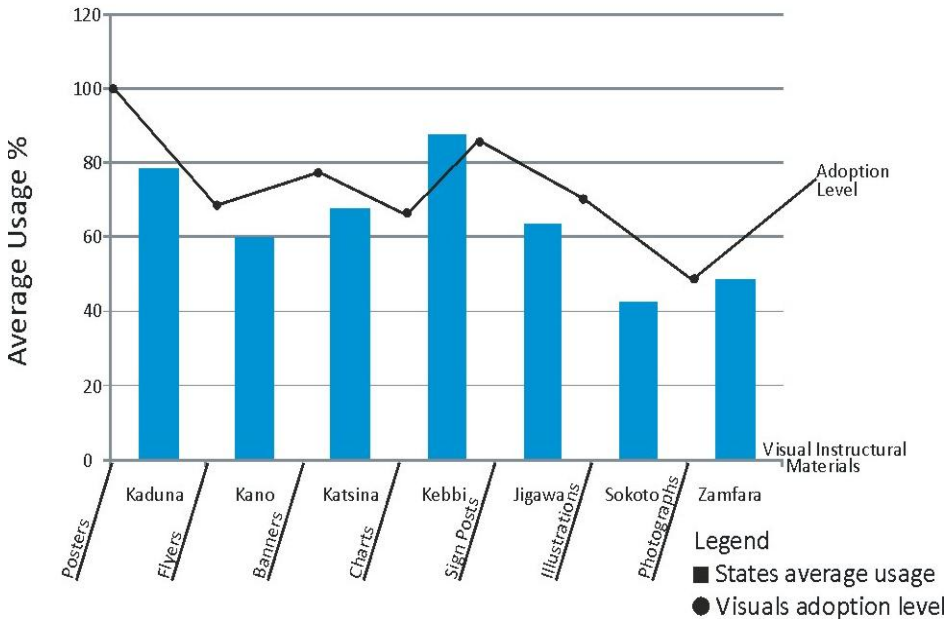
Table 7: Effectiveness of Visual Materials in Training

Variable	Frequency	Percentage (%)
No Response	2	3.8
Yes	32	61.5
No	9	17.3
Fairly	7	13.5
No Idea	2	3.8
Total	**52**	**100**

Effectiveness on Farmers in Adopting New Ideas

Variable	Frequency	Percentage (%)
No Response	4	9.6
Agree	43	82.7
Undecided	1	1.9
Disagree	3	5.8
Total	**52**	**100**

Fig 4: **Visual Instructional Materials usage and adoption across the North-West Zones.**



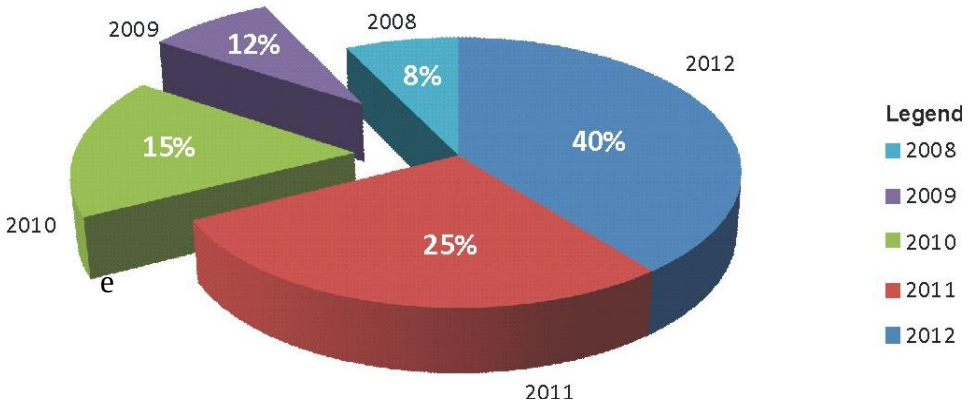
Source Research Findings

4.7 Usage of Visual Instructional Materials and adoption across the North-Western States.

In achieving the specific objectives of this study, the average usage and adoption of visual instructional materials in agricultural extension activities across the North-West Zone of Nigeria were evaluated. Figure 4, shows that the usage of visual instructional materials in agricultural extension activities was significantly high, where Kebbi State ranked 82%, Kaduna 78%, Katsina 69%, Jigawa 61%, Kano 60%, Zamfara 58% and Sokoto 42%; while visual instructional materials adoption showed that posters ranked 96%, signposts 84%, banners 78%, illustration 74%, flyers 65%, charts 62% and photographs 45% respectively. The effects of usage and adoption level by the

respondents were found to be appreciably high. These were tested using Chi-Square tests procedures at 5% level of significance.

Fig 5: Pie Chart Showing Technology Adoption through usage of Visual Instructional Materials in five years



Source: Research finding (2014).

The evaluation shows that messages on agricultural instructional materials such as posters, flyers and banners were well delivered and their usage has made a difference in agricultural practice and has added value to the quality of rural life as indicated in Figure 5, (Pie chart). The chart shows a progressive adoption percentage of improved agricultural innovation through effective usage of visual instructional materials across the North-West Zone of Nigeria. This was evident in the chi-square statistical tests in tables 8 and 9.

Table 8: Chi-Square Result on the worth of Visual Instruction Materials in Agricultural Activities

Usage of Visual Instruction Materials in Agricultural Extension Activities			Extension Workers/Farmers		Total
			Disagree	Not sure	
Do you have any opinion about the worth of VIAs	No response	Count % of Total	3 5.8%	0 .0%	4 7.7%
	Very worth while	Count % of Total	13 25.0%	0 .0%	14 26.9%
	Worth while	Count % of Total	27 51.95%	1 1.9%	30 57.7%
	Some what worthy of use	Count % of Total	2 3.8%	0 .0%	4 7.7%
Total		Count % of Total	45 86.5%	1 1.9%	52 100.0%

Tests	**Value**	**Df**	**Asymp. Sig. 2(Sided**
Chi- Square (χ^2 Calculated)	14.853[a]	12	.250
Likelihood ratio	12.847	12	.380
Linear-by-linear Asso.	.423	1	.516
χ^2 tabulated n = of valid cases	52		

a. 18 cells (90.0%) have expected count significant at 5%.

Table 9: Chi-Square test on the adoption of visual instructional Materials in Agricultural Extension Activities across the North-West Zone.

Adoption of visual instructional material in the North-West Zone			Rural Farmers Value	Total
Do you have any opinion about adoption of VIAs	No response	Count % of Total	0 .0%	4 7.7%
	Very worth while	Count % of Total	1 1.9%	14 26.9%
	Worth while	Count % of Total	1 1.9%	30 57.7%
	Some what worthy of use	Count % of Total	0 .0%	4 7.7%
Total		Count % of Total	2 3.8%	52 100.0%

Tests	**Value**	**Df**	**Asymp. Sig. 2(Sided**
Chi- Square (χ^2 Calculated)	2.297[b]	9	.986
Likelihood ratio	3.118	9	.959
Linear-by-linear Asso.	.0.53	1	.818
χ^2 tabulated n = of valid cases	52		

b. 14 cells (87.5%) have expected count significant at 5%.

4.8 Test of Hypothesis

In testing the research hypotheses, the Chi-Square statistical technique was used and presented in Tables 8 and 9. The results of the chi-square on visual instructional usage and adoption of new technologies were statistically significant at 5% level leading to rejection of the null hypotheses and affirmation that the usage of graphic visual instructional materials in agricultural extension services had significant effects in

adopting new ideas in agricultural practices thereby improving their quality of life. Usage of visuals ranked 90% and adoption of agricultural innovations ranked 87.5%.

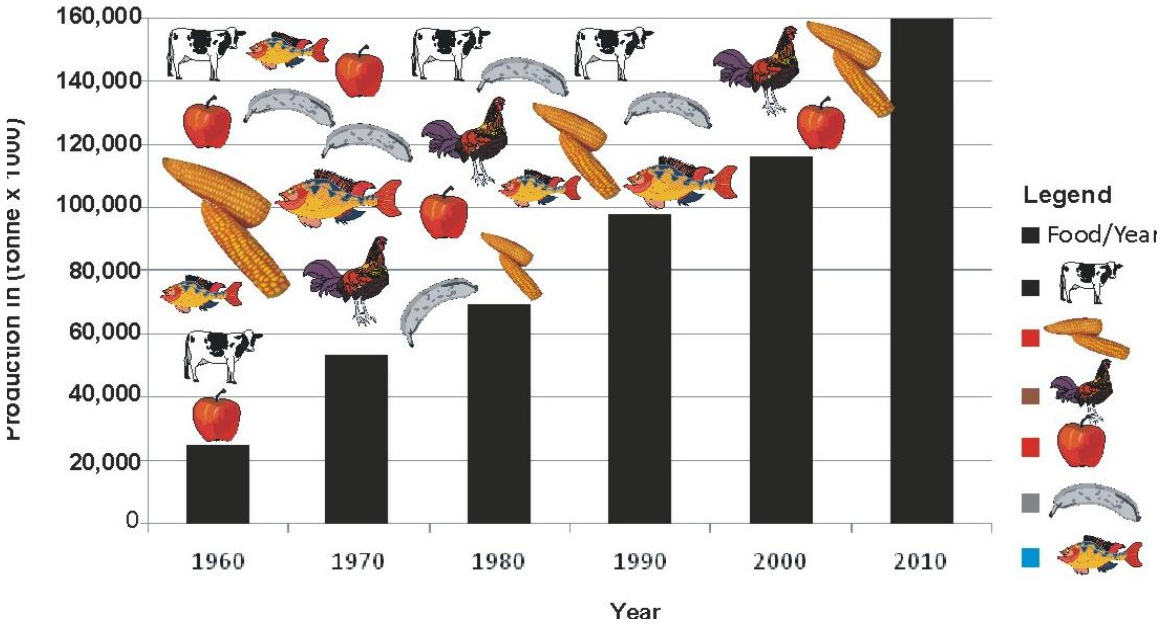
4.9 Test of Variables

The results shows that, the variables which were not statistically and positively significant (not associated) with visual instructional usage were; age, sex, marital status and rank. These variables did not have corresponding roles impact on visual instructional material usage in Agricultural Extension Services.

4.10 National Agricultural Production Trend

With reference to the chi-square tests results in tables 8 and 9, Adesina (2012) notes that the National and global demand for food is always rising with the growing population. Through enhanced agricultural information dissemination, production has witnessed a steady increase over years at an average rate of 3.5% within the last 50 years from 26,600 million metric tons in 1961 to over 142,000 million metric tons in 2010 as graphically illustrated in Figure 6.

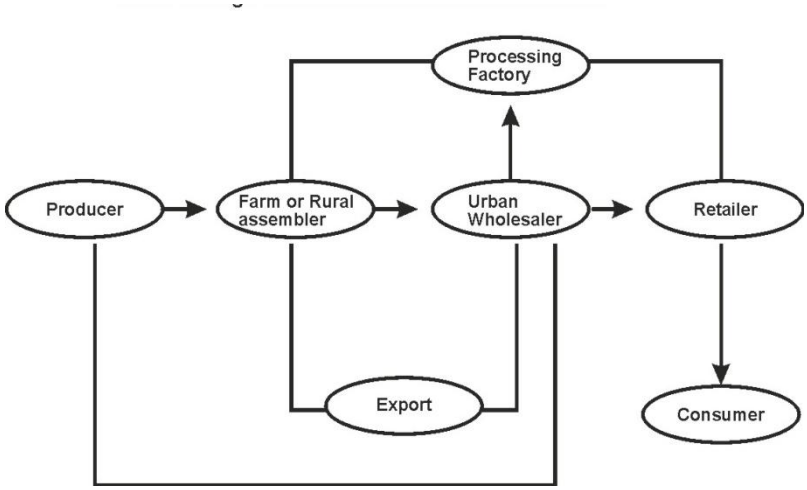
Figure 6: National agricultural production trend on sixty year period through enhanced agricultural instructional materials usage in extension services



Source: FAO/CBN/FMARD, 2012

The findings in this study are in conformity with CBN, FMARD and Amans (2012), that the main actors in agricultural production chain are the producers (Farmers), rural or farm-gate assemblers, urban assemblers or wholesalers and retailers (Figure 7). Through the effective usage of visual instructional materials in agricultural production processes, losses were highly minimized over the years due to better disseminated messages and enlightenment programmes. Farmers were able to adopt improved production practices of handling their farm produce to avoid unnecessary losses, that is the shorter transfer chain is between the farmer to the consumer, the lower will be the level of post-harvest losses.

Figure 7: Generalized pattern of Agricultural Produce Marketing Chain through effective Information Dissemination



Source**:** CBN/FMARD, 2012

4.11 Constraints of Visual Instructional Materials Usage in Agricultural Extension Activities.

Apart from achieving the specific objectives of this study, some constraints were identified which limited usage of graphic visual instructional materials in agricultural extension activities. The extension agents, farmers and graphic artists identified the following constraints. The result is presented in Table 10.

Table 10: Constraints on Visual Instructional Materials Usage in Agricultural Extension Activities

Constraining Factor	Frequency	Percentage (%)	Ranking
Inadequate trained extension agents	11	21.2	1st
Inadequate trained graphic artists	9	17.3	2nd
Ignorance of the participants involved	8	15.3	3rd
Organization impediments	7	13.5	4th
Lack of required instructional visuals	6	11.5	5th
Inadequate capital	5	9.6	6th
Differing perspectives	3	5.7	7th
Language barriers	2	3.8	8th
Illiteracy level	1	1.9	9th
Total	**52**	**100**	**Rank**

Inadequate trained agricultural extension agents ranks first among the list of constraints. Inadequate trained graphic artists ranks second revealing major challenges for the involvement of professional trained graphic artists in reversing the current status. According to respondents, information gathered from this study revealed that other challenges as presented in Table 10 include ignorance of the participants involved in the usage of visuals in agricultural extension activities which ranks third, organizational impediment forth, lack of required instructional visuals fifth, lack of adequate capital sixth, differing perspectives seventh, language barriers eighth and illiteracy level ninth. However the constraints which have not been adequately addressed in the evaluation

revealed significant level of visual materials usage and adoption among participants across the North-West Zone.

4.12 The Design Process and Production

The design process attempted to advantage of full computer input into the production of the instructional materials used for the study. Clips of some computer and other products of technology in visual instructional materials production for agricultural and farming systems usage are shown in plates 1, 2, 3, 4, 5, 6, 7, 8, 9,10,11,12,13,14 and 15. There are vivid impacts of computer graphic inputs in manipulations and rendition of each design in the various plates. This ranges from clear camera-ready art/design work, high contrast and vivid display of colours, increased emphasis on each design, assorted display of typography, explored alternatives of layouts, sophistication of images and special effects usage. The designs are electronically stored and can easily be revised and retrieved.

4.13 The Role of Design and Significance

The role and impact of design, was significant and effective in information dissemination. Design made farmers across the North-we4st zone to adoption of agricultural based innovation. The resultant effect was more crops were cultivated thereby improving the quality of rural livelihood, national food security and productivity.

4.14 Discussion of Findings on visual instructional materials

The parameters used for the design process and production were guided by the principles of design, they include simplicity, unity, emphasis and balance. The design of visual instructional materials for agricultural extension was also guided by design elements which include colour, size, shape/space and line. During the process attention was given to factors such as indentified in the serving objectives for flexibility and integration with other experiences and role impact.

Plate 1: Formal balance, visual emphasis, design concept on letter 'L', green dominant colour harmony representing agriculture to appeal to the farmer, balance was achieved by central visual juxtaposition.

Plates 2 and 12: Design concept on letter "X", formal balance, unity of visual elements, map of Nigeria was used to achieve balance, unity and colour harmony.

Plate 3: Formal design concept, colour balance and unity of element, vivid display of assorted colours give the beholder inviting appeal, with emphasis on visual element and typography.

Plates 4, 7 and 10: Design concept is formal, uniform colour balance, emphasis on visual elements and eye catching typography for the beholder/respondent.

Plates 5, 6, 8, and 9: Formal design concept, controlled by central balance and assorted blend of typography by sizes, colour and styles as well as decorative colour unity to attract the respondent formers on visual balance predominating.

Plate 11: Mixed design concept of circular rendition, and letter ‘Z’, visual elements display, with blends of predominating green colour depicting agriculture, this gives the respondents belongingness to the farming culture.

Plate 13: Design concept of top-bottom balance, visual elements concentration, limited typography, unity in colour display gives simplicity and attractiveness to the respondents.

Plate 14: Formal balance in design and center clustered visual elements, limited typography, with limited colour harmony.

Plate 15: Formal design concept, with limited colour usage of green and black, with a simple Ajami typography for the Hausa Arabic respondents.



Plate: 1. IAR Samaru Information Extension Roll-up Banner/Poster.

Source: Research work (2014).



Plate: 2. Extension Roll-up out/in door activities.

Source: Research work (2013).



Plate: 3. Legumes Programme display Roll-up banner.

Source: Research work

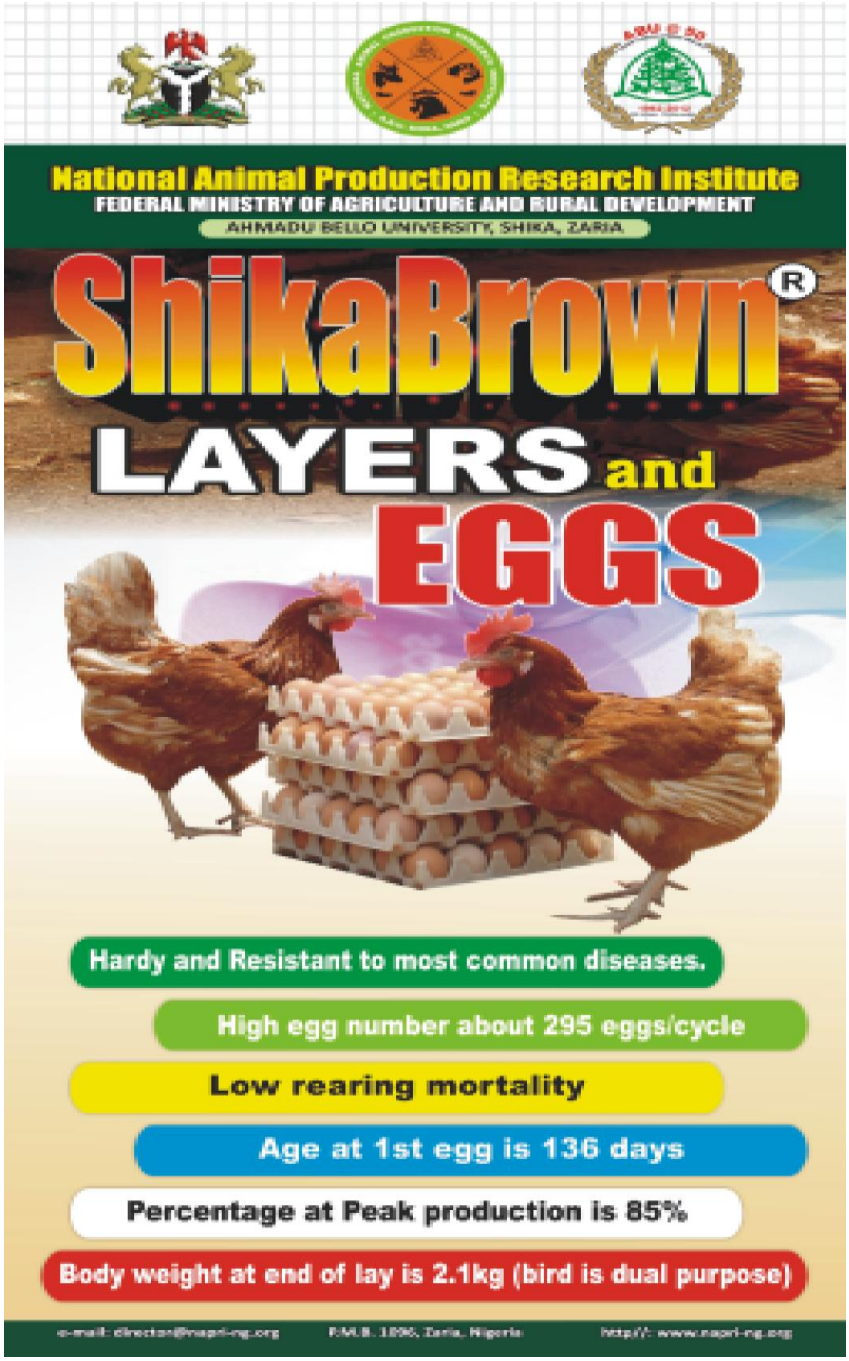


Plate: 4. Animal Production Display Roll-up banner/poster. .

Source: Research work (2012).



Plate: 5. Farming Systems display Roll- up banner /poster, one entity all functioning together to inform the farmer.

Source: Research work, (2013).



Plate: 6: Agricultural Transformation Agenda training. Roll-banner poster..

Source: Research work (2013).



Plate: 7. Beef Production in large ruminants..

Source: Research work (2012).



Plate: 8. Irrigation Extension /poster. .

Source: Research work (2013).



Plate: 9. Cereals Programme Extension poster. .

Source: Research work (2013).

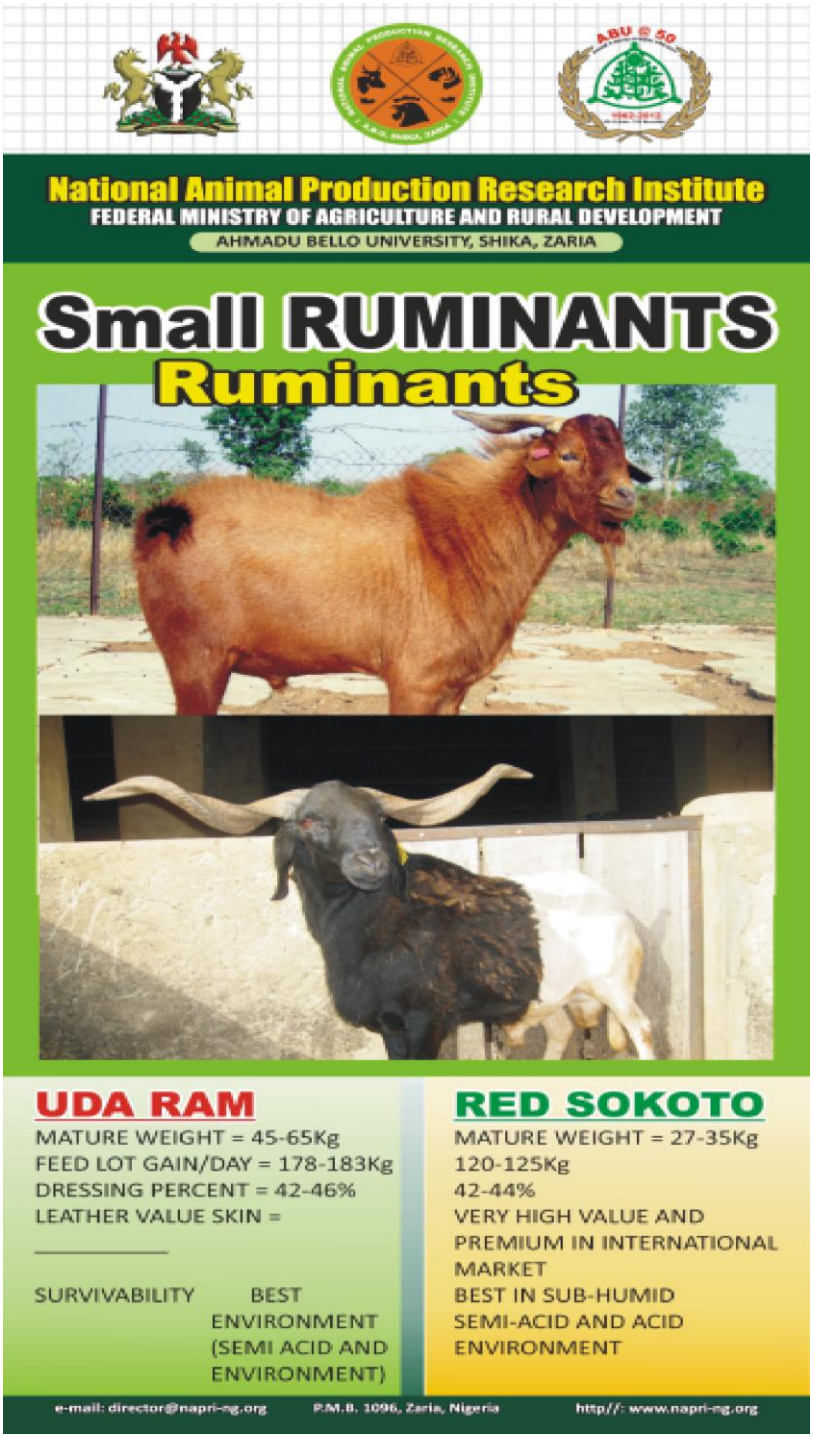


Plate: 10. Small ruminants, extension poster..

Source: Research work (2012).



Plate: 11. Workshop extension material.

Source: Research work (2014).



Plate: 12. State Experiments extension poster..

Source: Research work (2013).



Plate: 13. Seed Production Extension Roll-up.

Source: Research work (2013).



Plate: 14. Field activities extension material..

Source: Research work (2013).



Plate: 15. Ajami (Arabic) Extension materials used in the zone..

Source: Research work (2009).

CHAPTER V. SUMMARY, CONCLUSION AND RECOMMENDATIONS

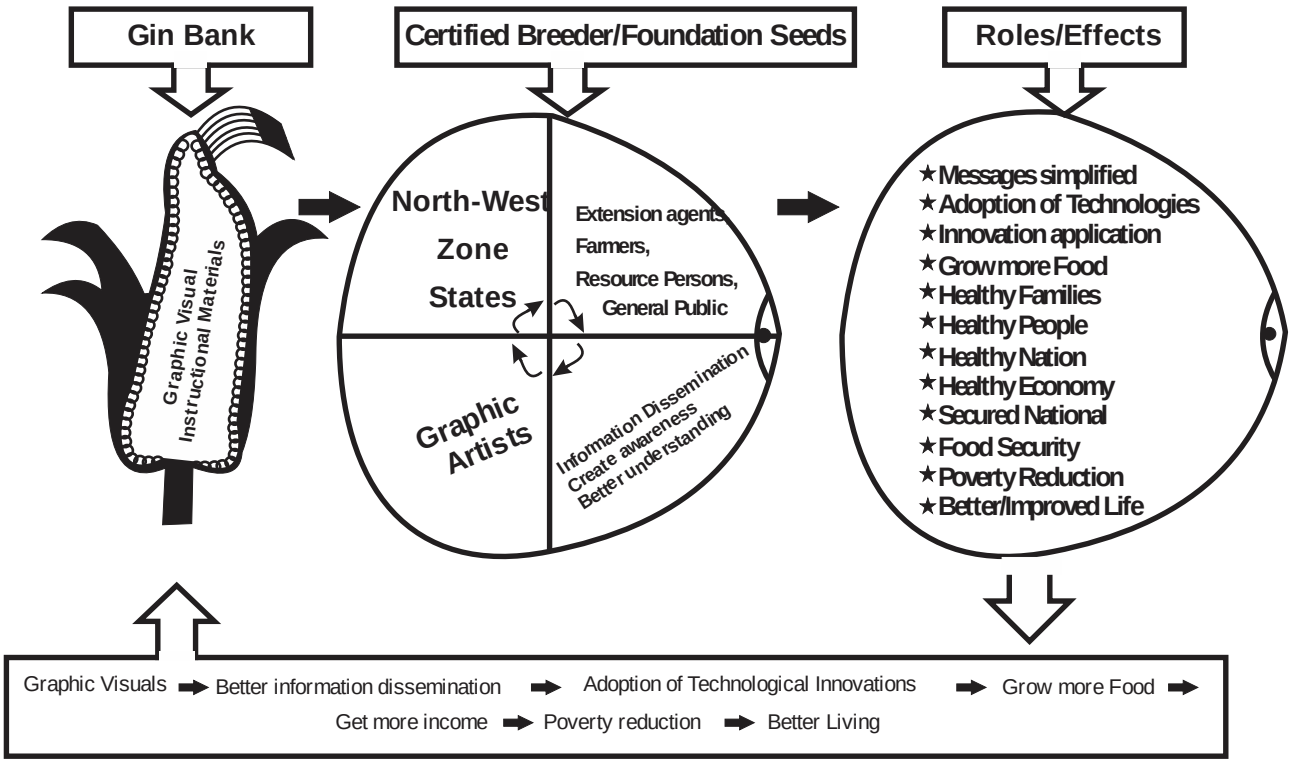
This chapter presents the summary of the study as well as conclusion and recommendations.

5.1 Summary

The study was carried out to evaluate the role of visual instructional materials in agricultural extension services in the North-West Zone of Nigeria. The study attempted to determine the demographic characteristics of respondents which showed that 70% of the users of visual materials were male, 30% were female. In gender variation male users were dominant. The study also found that 62% of the users were between the ages 18-39 years, and those of ages 40-59 years constituted 34% while those within 60 years and above account for 4%. The result showed 87% of the users were married with 12% being single, 1% divorced. Youths were higher in number which may be attributed to high rate of unemployment in Nigeria. The study revealed no significant relationship between these demographics and the variables examined.

The study found that the level of awareness of farmers was significantly greater in adopting new farm practices through usage of visual instructional materials in the North-West Zone of Nigeria. This implies that, the usage of visual materials has significantly influenced increase in productivity of the farmers and quality of rural livelihood.

Figure 8: **Model of Graphic visuals' certified breeder seeds in Agricultural Extension Services.**



Source: Research work (2014)

.

5.2 Major Findings

(1) Research, farmer linkage was achieved through visual instructional usage, more crops were cultivated improving rural livelihood and national food security.

(2) There was significant adoption of agricultural based innovations and youth were attracted to agriculture, reducing youth unemployment.

(3) Farmers across the North-west zone were better informed in terms of receiving agricultural messages in a simplified form.

5.3 Conclusion

From the evaluation of visual instructional materials impact in Agricultural extension services in the North-West Zone of Nigeria, the overall effect in agricultural activities, with the adoption level of usage in the study area, it can be concluded that the visual instructional materials had impacted significantly on the people in terms of receiving agricultural messages in a simplified form. Farmers and extension agents were better informed in adopting technological innovations in agriculture; farmers grow more food improving their livelihood, poverty reduction, national food security and national development.

5.4 Recommendations

Based on the overall findings of this study, the following recommendations are made:

The study found that the level of awareness of farmers were significantly greater in improved farm practices through usage of visual instructional materials. This revealed that the usage of visual instructional materials has brought about awareness which result increase in productivity of the farmer. It is therefore recommended that the usage of graphic visuals in agricultural extension services be introduced in other zones across the nation to support a sustainable national agricultural production.

It was found that the roles of visual instructional materials in agricultural extension services were effective in improving information dissemination. Hence, agricultural extension messages were adequately disseminated to farmers

with greater ease attributable to simplified message contents. Therefore agricultural extension agents should be encouraged to always use visual materials for effective communication in agricultural programmes.

The percentage of visual instructional material usage and level of adoption in every state were high. It is, therefore, recommended that States Agricultural Development Programmes (ADPs) should promote usage and replication in other states to sustain agricultural extension activities.

It was found that the youth participated more in usage in VIM with 62% of total users. It is recommended therefore that the youths should be encouraged to get involved in agricultural programmes to sustain the agricultural sector and similar sectors to reduce youth unemployment.

The study identified some constraints such as inadequately trained extension agents, lack of trained graphic artists, ignorance of the participants involved, organizational impediments, lack of required instructional visuals, lack of adequate capital, differing perspectives, language barriers and illiteracy level. If this trend is not addressed properly by the relevant authorities it may affect agricultural information dissemination to farmers, which may lead to ineffective service delivery.

The findings revealed the vividness of visual instructional materials have impact on agricultural production and adequate services delivery across the North-West Zone. Hence, value chain addition due to effective information dissemination may have direct influence and also address some of the challenges of the Federal

Government Policy in the Agricultural Transformation Agenda (ATA) as well as supporting the programme

Based on the findings designs can be qualitative when the basics rudiments guiding the production via the principles and elements of design in visual instructional materials production for agricultural.

Any visual communication outfit for information dissemination could implore the same principles and elements of design for effective design rendition and quality

5.5 Suggestions for Further Study

i. Further studies should be extended to other states to ascertain the level of conformity with the obtained results in this study.

ii. Additional research can be carried out as post evaluation in the same zone to examine the sustainability of graphic visual instructional materials usage in agricultural extension.

iii. Such studies should be carried out in other disciplines like human and community medicine to examine the multi-disciplinary effectiveness of visual instructional materials and their ability to used in a wide variety of endeavours.

iv. Further studies can also look at conflict management within the scope of visual instructional materials usage to ascertain effectiveness in intervention processes namely: religious, political, educational in any given volatile situation in Nigeria.

5.6. Contributions to Knowledge

1. The research revealed that farmers across the North-West zone of Nigeria were better informed about agric. based innovations through the visual instructional materials provided by this research.

2. The use of visual instructional materials also enhanced research farmer linkage among the North - west zone farmers.

3. There was significant improvement in crop production and livelihood of the North –West zone rural farmers in 2014.

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APPENDIX I

QUESTIONNAIRE

(A) DEMOGRAPHIC CHARACTERISTICS (EAs)

1. What is your age? Under 18 ( ) Above 18 yrs ( ) Above 25 yrs ( )

   Above 35 yrs ( )

2. Where were you born? Hamlet ( ) Village ( ) Town ( ) City ( )

3. Are you married? Married ( ) Single ( ) Divorcee ( ) Undecided ( )

4. What is your fathers' major occupation: …….

   ……..……

5. What is your mothers' major occupation: ……

   ……..……..

6. Educational background:

Type/Level	Years	Qualification Obtained
Primary school		
Secondary school		
Teachers college		
School of agriculture		
University		
Others (specify)		

7. What formal training in Agricultural Extension Services do you have?

   Certificate ( ) Diploma ( ) Degree ( ) Never ( )

8. How many times have you participated in any Agricultural training programme on visual instructional production/usage?

   Once ( ) 2-5 time ( ) 6-10 times ( ) Never ( )

9. In what capacity did you participate?

   As a resource person ( ) As an ordinary participant ( ) As an organizer ( )

Specific Information

10. How many instances did you observe the use of visual instructional materials in your service years? …….

11. In your years of service how many times have you used visual instructional materials directly?

    Just once ( ) Always ( ) Occasionally ( ) Never ( ) Others ( )

12. Do you have any opinion about the usage of VIAs?

    Very worth while ( ) Worth while ( ) Some what worthy of use ( ) Worthless ( )

(B) ORGANIZATIONAL CHARCTERISTICS

(Structure, administration and personnel policies)

13. Who do you work for?

    (a) Local Government ( ) (b) ADP ( ) (c) State Government ( )

    (d) Federal Government ( ) (e) Other (Specify) ……..

14. Which of the following extension units do you belong?

    a. General extension ( ) (b) Horticulture ( ) (c) Crop protection ( )

    d. Seed multiplication ( ) (e) Other (specify) ……

15. How much influence do you think the following categories of people have on extension policy decision and planning in visual instructional materials usage?

Categories	None	Some influence	Great influence
Chief Extension Technical Officers	( )	( )	( )
Zonal Extension Officer	( )	( )	( )
Graphic Artist	( )	( )	( )
Development Officer	( )	( )	( )
Farmers/Farmers Organization	( )	( )	( )

16. Is extension organized along specific instructional aid programs/activities.

Yes ( ) No ( ) Not sure ( ) No idea ( )

(C) EXTENSION AGENTS' ATTITUDE TO FARMERS

Could you please respond to the following statements?

17. Working with farmers is it interesting when USING visual instructional materials

Agree ( ) Undecided ( ) Disagree ( ) Not sure ( ) No idea ( )

18. What is your opinion in living and working with farmers in rural areas?

……

19. What is your opinion about rural people learning with VIM?

……

20. An extension worker should not be concerned with rural farmers

Agree ( ) Undecided ( ) Disagree ( ) Not sure ( ) No idea ( )

21. Farmers are quick in adopting new idea while using visual instructional materials

Agree ( ) Undecided ( ) Disagree ( ) No sure ( ) No idea ( )

22. What would you say are the major problems being experienced in using visual instructional materials?

……

……

23. Could you suggest possible solutions to these problems?

……

……..……

(D) UNDERSTANDING VISUAL INSTRUCTION

24. Do you understand the meaning of visual instructional material?

Yes ( ) No ( ) Fairly ( ) Not always ( )

25. Can you read the messages contained in any visual material?

Yes ( ) No ( ) Fairly ( ) Not always ( )

26. Can you read VIM produced in Hausa?

Yes ( ) No ( ) Fairly ( ) Not always ( )

27. Can you read Arabic Visual Material

Yes ( ) No ( ) Fairly ( ) Not always ( )

28. When you read any message on a visual instructional material can you easily explain to another person?

Yes ( ) No ( ) Partially ( ) No idea ( )

29. Do you enjoy the use of colours in the visual instructional material as an advantage to influence other user?

30. Are the pictures on the posters clear enough to your understanding?

Yes ( ) No ( ) Partially ( ) No idea ( )

31. How effective can the size of visual materials (large/small) attract the attention of a farmer?

Very effective ( ) Effective ( ) Fairly effective ( ) not effective ( )

32. Can you say to what extent visual instruction materials have affected your Agricultural Extension Messages?

Very effective ( ) Effective ( ) Partially effective ( ) Not effective ( )

No idea ( )

APPENDIX II

QUESTIONNAIRE

DEMOGRAPHIC CHARACTERISTICS (FARMER)

1. What is your age? Under 18 ( ) Above 18 ( ) Above 25 ( ) Above 35 ( )
2. Where do you live now? Hamlet ( ) Village ( ) Town ( ) City ( )
3. Are you married? Married ( ) Single ( ) others ……
4. What is your major occupation? ……
5. Have you ever enrolled in formal school? ……
6. State whether Western or Islamic? ……
7. How many years did you spend in school? ……
8. You graduated with what kind of certificate? ……
9. Do you have an extension agent? ……
10. How often do you interact with him/her ……
11. Had the extension agent ever used visual instructional materials for you?

    Yes ( ) No ( )
12. How many times? …….
13. Do you always understand the message in visual instructional aids?

    Yes ( ) No ( ) Partially ( )
14. Do you like the colours in the visual instructional aids?

    Yes ( ) No ( ) Partially ( )
15. Does each of the visual instruction aids help you in improving your faming activity? Yes ( ) No ( ) Partially ( ) No idea ( )

16. In what language do you prefer visual instruction aids to be designed

English ( ) Hausa ( ) Injami/Arabic ( )

others specify ……

17. Do you like the sizes in which visual instructional materials come?

Yes ( ) No ( ) Too small ( ) Too big ( ) Just okay ( ) Others specify ……

18. Do you find the illustrations in visual instructional materials useful?

Yes ( ) No ( ) Too small ( ) Too big ( ) Just okay ( )

Others …..……..

19. Do you understand the message of a visual instructional material?

Yes ( ) No ( ) Partially ( ) only in Hausa ( ) only in Ajamin/Arabic ( )

20. Do you need training to understand and use visual instruction materials?

Yes ( ) No ( )

APPENDIX III

Other Visual Instructional Materials Design