AGRICULTURAL EXTENSION AND RURAL
DEVELOPMENT CENTRE
READING UNIVERSITY

A SYSTEMS AFPROACH TO FIELD LEVEL AGRICULTURAL EXTENSION TRAINING WITH SPECIAL REFERENCE TO THE NORTHERN STATES OF NIGERIA

A Thesis presented as partial fulfillment of the requirements for the degree of M.A. in Rural Social Development at the University of Reading

NELSON ORINYA IFERE

AUGUST, 1980

To my Wife, Ayi

and children, Otsonu and Onyetsi

ACKNOWLEDGEMENTS.

The time, energy, resources, encouragement and patience of so many people were involved in making this small work a success and any attempt to name them all would consume as much space as the dissertation itself. For this reason, I want to say I am grateful to all of them.

However, some deserve special mentioning among whom are: my supervisor, Mr. Danny J.Griffith for his encouragement and advice, Dr.CC.C. Onazi, Director, Division of Agricultural Colleges, Ahmadu Bello University, Zaria for his interest and support, my Senior brother, Brigadier S.O.Ifere who has always been a big butress in my educational career, all the staff of Agricultural Extension and Rural Development Centre, Reading University for their co-operation throughout my stay.

The inestimable contributions of my typist Barbara Alsop and my wife, Ayi Ifere also deserve

Acknowledgements contd.

special acknowledgement.

Finally, I wish to register my gratitude to the Government of Benue State of Nigeria for providing me the financial support to undertake this course.

Table of Contens Contd.

CHAPTER.		PAGE.
5		
5.1	Relevance of System Approach to Middle level Agricultural Extension Training in the Northern States of Nigeria	83
5.2	Middle level Agricultural Extension Training in the Northern States of	87
5.3	History of Education in Nigeria	95
5.4a	Agricultural Education in Nigeria	101
5.4b	Intermediate Agricultural Education	103
5.5	Summary and Conclusion	112

BIBLIOGRAPHY

1. Butler R. D. A study of selected non-degree Agricultural Training Institutions in the Western State of Nigeria. CSNRD - 29, Michigan State University, East Lansing, Michigan, U.S.A. 1969.

2. Clark R. C. Professional Development of Extension Officers. Bulletin of Rural Economics and Sociology vol. 2 no.2 1967, (pp 75-83).

3. Coombs P. H. and Ahmed M. Attacking Rural Poverty. John Hopkins University Press 1974.

4. Davies I. K. The Management of Learning. McGraw Hill. London. 1971 (pp 19-52).

5. Edney P. J. A system analysis of Training. Pitman Publishing 1972 (pp 1-22).

6. Etzioni A. Two Approaches to Organisational Analysis: A critique and suggestion. Admin. Sc. Quart. 5: 257-278 1960.

7. Fafunwa A. B. The History of Education in Nigeria. London George Allen and Unwin Ltd. 1974 (pp 73-138).

8. F.A.O; UNESCO, I.L.O. World Conference on Agricultural Education and Training Report, vol. 2 1970.

9. Gagné R. M. The Conditions of Learning. Holt, Rinehart and Winston, Inc. 1965 (pp 18-86).

10. Grace J. K. (Ed.) The Challenge of System Analysis. The M.I.T. Press Cambridge, Massachusette and London 1970(pp 151).

11. Grounlund N. E. Mearsurement and Evaluation in Teaching. MacMillan Co. N.Y. 1965 (pp 3-42(.

12. Kaufman R. A. Educational System Planning. Prentice Hall, Inc. Englewood Cliffs, New Jersey 1972. (pp 10-129).

13. Kincaid J. M. Jr. Strategies for the Improvement of Agricultural Extension Work and non-degree Agricultural Training in Nigeria. CSNRD - 13 Report, 1968. USAID Publication.

14. Mager R. F. Preparing Instructional Objectives. Fearon Publishers, Lear Siegler, Inc. Educational Division, Belmont, California 1962 (pp 1-43).

15. Mayr O. The Origins of Feedback control. The M.I.T. Press Cambridge, Massachusetts and London, England 1970 (pp 151).

16. Olatunbosun D. Nigeria's Neglected Rural Majority 1975.

17. Onazi O. C. An Analysis of Training needs of Potential Agricultural Extension Workers in Northern Nigeria. Journal of Rural Economy and Development vol.9 no.2, 1974/75.

18. Peters G. & Beishon J. Systems Behaviour, Open University Set Book. Harper and Row Publishers, London, 1972 (pp 5-20).

19. Razik T. A. Systems Approach to Teacher Training and Curriculum Development: The case of Developing countries UNESCO: International Institute for Educational Planning. Paris 1972 (pp 15-35)

20. Rowat R. Report to the Federal and Regional Governments of Nigeria on the Development of Education and Training in the field of Agriculture and Related Subjects (pp 6-52) F.A.O. Rome 1965.

21. Robert L. The Rise Systems Theory. An Ideological Analysis. JohnWiley & Sons N.Y. 1978 (pp 7-32).

22. Schulberg H. C. and Baker F. American Journal of Public Health vol. 58 no. 7 July 1968 (pp 1248-1255).

23. Suchman E. A. Evaluating Educational Programs. The Urban Review vol. 3 no. 41 Feb. 1969 (pp 15-17).

INTRODUCTION

In the developing countries in which agriculture occupies a dominant place in both the economy and in people's lives, the change over from subsistence to modern agriculture becomes the determining factor in transforming the rural enviroment. In this connection the role of professional training in bringing about substantial improvement in level of living is essential. Organised in various forms and using various means for improving the skills and knowledge of the agricultural change agents, professional training increases the possibility that the ultimate beneficiaries (farmers) receive the most recent techniques in a form which can be easily understood, assimilated and finally applied on their farms.

The widespread and urgent need for well trained agricultural field level workers is recognised, and their shortages seen as a major factor limiting agricultural progress in many countries today.

A considerable amount of work has been done on the problem of determining what constitutes an adequate and relevant training program for field level agricultural workers in general as well as operating in a particular system. Speaking on the former, Clarke, (1967) is of the opinion that to be effective, an agricultural change agent requires training in three broad areas of knowledge and this includes:

(1) Technical subject matter pertaining to plants, animals, soil, machinery, home and family life and economic and social problems.

(2) Skills required to be an effective educational leader in the teaching learning process in the diffusion of new technology and evaluating program accomplishments; and

(3) knowledge and skills essential in administering and supervising large scale, complex and highly inter-related educational and service programs.

On the other hand, the problems of specific

training programs in the former Western State of Nigeria have focused attention on the adequacy of practical experience, sufficiency of materials, the relevance of the whole training program to the roles of the trainees after completing the training, and the orientation of the trainees to agriculture and working with farmers in the rural areas.

On the adequacy of practical experience, Kincaid, (1968) in his summary of a consortium report states that the most critical problem in non-degree level agricultural training in Nigeria is the absence of "field practice" orientation. He goes on to say that:

> Non-degree training, especially for those who are to work in field service activities must strive to create a desire "to make things happen" in rural development at the villlge level.... more concerted effort must be made to introduce meaningful practical field experience into the..... training while at the same time providing sufficient knowledge of basic principles and techniques of agricultural production, extension methodology, etc.

Butler, (1969) made a similar observation on the training program for field agricultural agents. His study of four agricultural and related schools in the former Western State of Nigeria reveals that insufficient and/or innadequate emphasis was placed on learning by doing in each of these institutions.

With regards to sufficiency of materials and equipment, previous studies have described the situation as unsatisfactory. Kidd, (1968) alluded to the problem of relevance of the extension agents' knowledge to the practical problems of their clientele. Less than half of the farmers he studied felt that the local extension workers know farmer's problems. This, it is hypothesised, may be due to the gap in the agents' knowledge regarding the reality of the conditions in which the farmers live including their customs, values, and aspirations. If this is so, then an obstacle has been placed in the way of farmers adopting recommendations by agents. This with many other problems related to effective extension training highlighted our interest in an all

embracing investigation into extension training - system analysis. It is hoped that this approach will shed very useful light on potential problem areas for field level agricultural workers.

CHAPTER 1

1.1 THE BEGINING AND SPREAD OF SYSTEM THINKING

The wake of system thinking can not be dated with any precision as the concept cuts across a very wide field of knowledge. The impetus towards system thinking and system approach has come from recognition of the complex behaviour which does arise from both natural as well as man-made systems. Another reason for the trend towards system analysis is the attempt made by society these days to predict and control with some degree of confidence, the behaviour of natural and man-made phenomenon.

So much has been written on systems and yet very little is known about it's analysis, control, and design. Even when attempts are made at grappling with these problems, defining and fixing the boundries of systems is yet another formidable problem which physical as well as social scientists have had to face without any clear solution until now. A

wealth of information seems to abound on system structure in both the physical and social sciences, for example the anatomy of the human body, the positions of various planets in the galaxial system are fields almost exhausted in investigation. In the social sciences, a lot has been written on the pattern and structure of society whether simple tribal societies or the complex industrial societies characterized by the first world's towns and cities.

At this point a definition of this central concept of system will be most appropriate here. In the words of "F. E. Kast and J. E. Rosenzweig" a system is "an organised or complex whole: an assemblege or a combination of things or parts forming a complex or unitary whole". From this definition it is obvious that system thoughts runs through a wide coverage, such as the human being as an entity, social institutions and complex organizations of modern societies. The origins and development of this interdisiplinary analitical tool called system approach forms the next section of our discussion.

1.2 THE BIRTH OF SYSTEM ANALYSIS:

It is interesting to note that the popularity of system thoughts in the social sciences notwithstanding, the earliest pioneers in this field were mostly physical scientists. Men like, (Henderson, L. J. "1878 - 1942", Cannon W. B. and Bertalanffy L. V. "1901 - 1972") were the first scholars to put their thoughts in writing in this field.

Henderson was a medical graduate of Harvard but after some period of lecturing in bio-chemistry his interest in the philosophy of science diverted his attention mainly to sociology. He later taught sociology and his writings, though not many can be seen in the popular Harvard "Sociology 23 Lectures". Like all physical and natural scientists he leaned very heavily on analogies from biochemistry and physics but his central focus in system thoughts was the idea of "equilibrium", which according to him was essential to the study and understanding of social processes.

In his own words equilibrium means: "a state such that a small modification different from that which will otherwise occur is impressed upon a system a reaction will at once appear tending towards the condition that would have existed if the modification had not been impressed..... Equilibrium is an equilibrium of forces, more or less like the equilibrium for instance in a box spring; that a small modification leaves the forces substantially intact; and that the forces tend to re-establish the state that would have existed if no modification had occured".

In Henderson's thought, a like condition exist in the social world in the sense that all factors (persons, intrests, residues etc.) are naturally dependant and interactive. He climaxed his system theory building with a mathamatical model in which he attempted to show how all factors in a social system as being in a state of natural dependence on each other.

Another forerunner of the early system school was a professor of Medecine at Harvard Walter B. Cannon. Most of Cannon"s work was in medecine but he was profoundly interested in the philosophy of science. His interest and central leaning can be noticed in his book titled "The Wisdom of the Body" in which he developed ideas that were influential in the development of system thinking later. This was principally an analysis of the functioning of the human body system but Cannon drew a parallel with the social world. The central theme of this book is the concept of "Homeostasis" which he explained exist in the human organism helping to maintain fixed levels of blood sugar, blood protein, fat and calcium as well as adequate supplies of oxygen and a constant body temperature. This in short is a condition of constancy which though varying slightly from time to time always returns to the normal state. In as much as this seems to be mainly an explanation in the natural science Cannon concludes his book with a parallel in the social world in these words; "Are there not a

general principals of stabilization? May not the devices developed in the organism for preserving steady state methods which may be used elsewhere? Would not a comparative study of stabilization process be suggestive, might it not be useful to examine other forms of organizations, industrial, domestic or social in the light of the organization of the body?"

This way of perception places Cannon as one of the earliest of system thinkers.

But perhaps the single individual whose work in early system thought was most profound was Ludwig Von Bertalanffy (1901-72). His formulation of the concept of "the open system" was the first writing to come out on outright system analysis unlike earlier philosophers whose works were usually spill-overs from pure science analogies. In his work on "the theories of development" (1953) and "the problem of life" (1952) Bertalanffy sees all sciences as a hierachy of statistics that eventually merge

towards a universal unity with each other. He sums up this idea of the universal unity of sciences in the following words:

> "All laws of nature are of a statistical nature. There are statements about the average behaviour of collectives science as a whole appears as a hierarchy of statistics. At the first level is the level of microphysics..... a second level is constituted by laws of macrophysics..... At still higher level is represented the biological realm..... Finally there are the laws that apply to the supraindividual unit of life..... laws of this kind are the basis for insurance statistics, and are of great practical and commercial importance".

According to Bertalanffy these are not mere analogies but pure fundamental unity of the sciences. To distinguish between mere analogy and pure scientific unity, he classified levels of analysis into three components namely; analogy, logical homologies and explanations.

By analogy, he meant the superficial similarities which exist between phenomena but do not correspond to any underlying factors or laws operating in these. This he termed superficially worthless. Logical homologies on the other hand is a situation in which phenomena differ in the causal factors involved but are governed by structurally identical laws, for example the flow of fluid and the conduction of heat which are governed by the same law but fundermentally differ in the causal factors involved. Explanations is the verbal picture which we build to illuminate ideas or situations.

The final culminations of all these was Bertalanffy's "General System Theory" published in an essay in (1952). This new outlook aroused so much interest of the scientific community of that time giving rise to the formation of "The Society for General System Theory" in 1954. This society has since then published an annual in which works of phylosophy, psychology, socio-cultural as well as physical

sciences featured. The society later changed it's name to "The Society for General System Research. It's modern off-shoot is the "International Federation of Operation Research societies".

In concluding our brief history of the rise of system analysis, it will be appropriate to state that this mode of thinking is just an old school of thought emerging in a new form in this century. This is backed by the fact that any critical exray of the paradigm exposes it to be no differant from the organistic view of society preached by earlier sociologists like, Kenneth Bock and other "Social Darwinists" that view society as an organism, subject to growth and decay, which evolve over time into new and differentiated forms.

It is from the background which has just been surveyed that system theory and the approach spread to various fields of knowledge, physical, natural as well as the social sciences. One area where this

new outlook was extensively used was in "Operations Research". This was simply a management decision making process during the last war whereby the interaction between firstrate scientists, combat troops and the war executives, turned out scientific decisions based on information gathered and analysed by experienced generals and scientists working together. It is also from this source that modern management theorists delved into the application of system thoughts to industrial as well as general bureaucratic practices. This leads us to the important issue of the types and hierachy in which systems can be viewed.

1.3 SYSTEM TYPES AND CLASSIFICATION IN HIERARCHICAL ORDER

Since the publication of Von Bertalanffy's essay on general system theory and the formation of the Society for General System Research about (1954), the base for the intergration of scientific knowledge across a broad spectrum was solidly layed. Following the universality of system thoughts, the need to give some pattern and order to the field became indispensable, resulting in the broad classification of system types into two main headings, closed and open systems. A system is said to be open or closed depending on whether it is in close contact with it's enviroment or not.

Closed systems are mostly associated with physical science thinking. One major characteristic of closed systems is that they are self-contained and have "an inherant tendency to move towards static equilibrium and entropy" Beishon and Peters (1972)". "Opeter (1968)" defines a closed system as those which

are fully adaptive to their enviroment. A good example of closed system could be a transplanted tree placed in a glass jar where evaporation from it's leaves has no route for escape but condenses within the jar. The carbon dioxide level is kept constant, at the same time the soil is not replenished. Under this situation it is obvious that the tendency to increase entropy will result in the death of the plant.

In contrast to closed systems with unpenetrable boundaries, the open system is always in contact with the external enviroment without which the essential processes for existance cannot proceed. This is obvious of biological systems of plants, animals micro-organisms and the social systems. These receive inputs continually in the form of materials, solar energy, etcetra and transforms them into outputs in some form or the other.

The levels of systems hierarchy presented by

F. E. Kast and J. E. Rosenzweig best elaborates the points earlier raised on systems types and classification. This classification cuts across the fields of enginerring, biological seinces, business and other organizational set-ups such as management and training.

The hierarchy is as follows;

1) "The first level is that of static structure. It might be called the level of framework; for example, the anatomy of the universe.

2) The next level is that of the simple dynamic system with pre-determined necessary motions. This might be called the level of clockworks.

3) The Control mechanism or cybernetic system which might be nicknamed, the level of the thermostat. The system is self-regulating in maintaining equilibrium.

4) The fourth level is that of the "open system" or self maintaining structure. This is the level at which life begins to differentiate from non-life. It might be called the level of cell.

5) The next level might be called the genetic-social level; it is typified by the plant and it dominates the empirical world of the botanist.

6) The animal system level is characterised by increased mobility, technological behaviour and self awareness.

7) The next level is the human level, that is, individual human beings considered as a system with self awareness and the ability to utilize language and symbolism.

8) The social system or systems of human organisation constitute the next level with the consideration of the content and meanings of messages, the nature and dimension of the value of systems, the transcription of images into historical records, the subtle symbolisations of poetry and the complex gamut of human emotions.

9) The transcendental systems completes the classification of levels. These are the ultimate and absolutes and the inescapable unknowables and they also exhibit systamatic structure and relationships". (pp 14).

A close look into the classification reveals some pattern of uniformity among and between the nine levels as follows. The first three levels in the hierarchy can be called physical or mechanical systems and provides the knowledge the realms like physics and astronomy. The fourth, fifth and sixth levels are concerned with biological systems of both plants and animals. The last three levels are involved with human social system and are concerned with social sciences, arts, humanities and religion.

This leads us to the system type with which we will be concerned throughout the rest of this work - the open system. The next section sheds more light on it's features in detail for purposes of clarity.

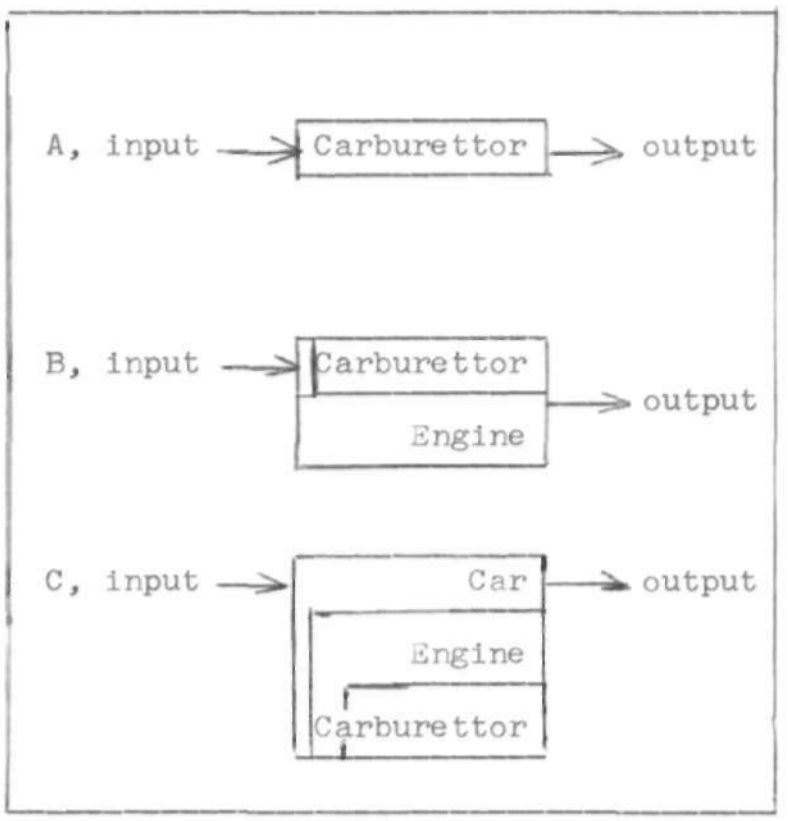
1.4a SYSTEM PROPERTIES AND FEEDBACK MECHANISM

The idea of open system was principally a pathway into physics and biology but later through the process of homology which may be defined as situation where

phenomena differ structurally but are governed by structurally identical laws, this concept was extended to other sciences including the humanities. Having defined what an open system is in contrast to a closed system earlier on, an attempt will be made at this point to highlight the properties of systems generally and the indispensable mechanism of feedback.

One very important feature of any system is the interdependence of components which we may term sub-systems. These sub-systems together with other related systems, is a sub-system of a larger system. This relationship of components and sub-systems always tends towards a steady state, towards a balance of forces which is stable and enduring. Another important feature of systems is that their sub-systems are always in interaction with each other and could only be considered as a complete whole. This interaction is caused through the output of one system providing inputs for other sub-systems. Figure one below illustrates this point very clearly using the

inter-relationship of a motor car system.



Carburettor as a system.

Carburettor as a component of system "Engine".

Engine as a component of system "Car".

Fig. 1.1 Source: P. J. Edney (1972).

In this instance, the principal system of the car is the engine, which is a mere component of the total car. The engine on the other hand is made up of various components which could be termed sub-system of the engine or whole system on their own. This logically

leads to the question of the boundary within which a system might be observed or examined as every system in the universe could be considered as a component of a larger system.

The limit or boundary of any system can therefore be defined as a functional limit which is governed by input and output relationship, as shown below in figure two.

System Boundary

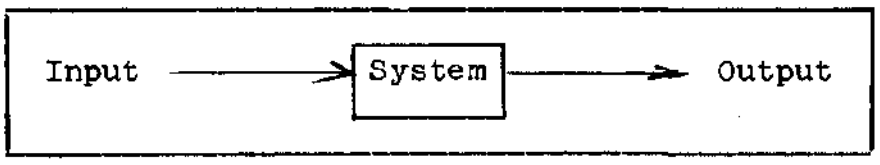


Fig. 1.2

Another good example of an open system is Trist's illustration of an organisation as a socio-technical system with inputs-out relationship built into the boundary of five major sub-systems namely; Goals and values, technology, structure,

psycho-social and managerial sub-systems.

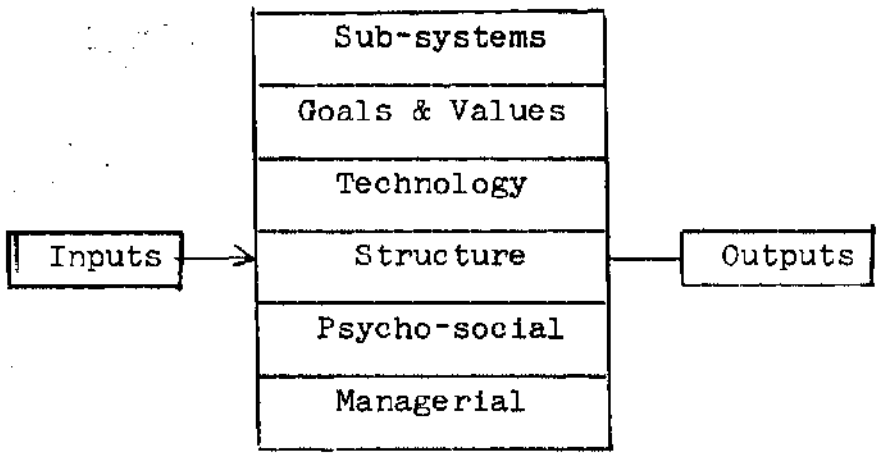


Fig. 1.3 Organization as a socio-technical system.
Source: after Trist (1973).

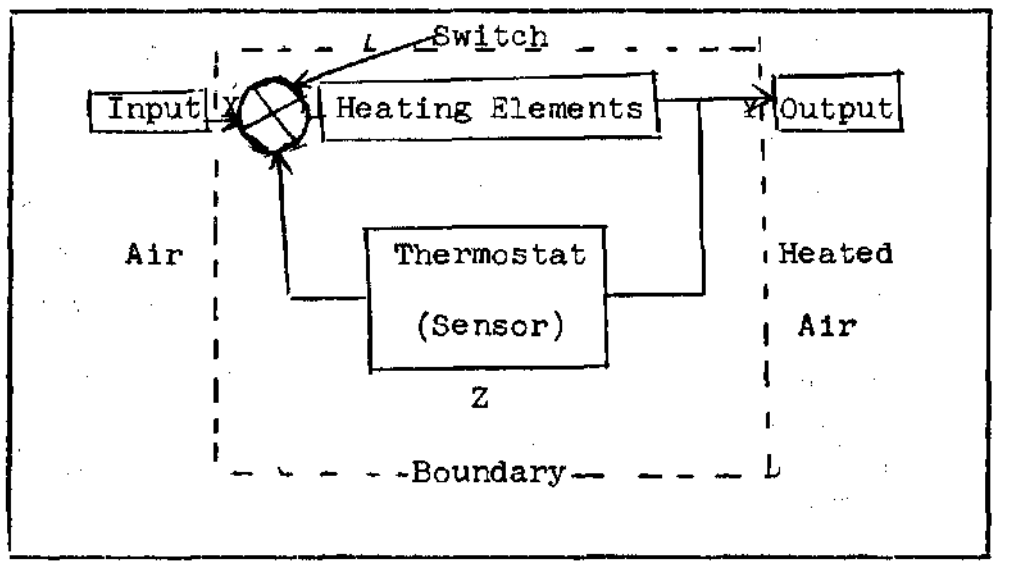
Under this view an organization is not simply a technical or social system but rather; it is the structuring and intergrating of human activities around various technologies. The technologies affect the types of inputs into the organization and at the same time the output from system with the social system determine the efficiency and effectiveness of the utilization of the technology. This illustration is similar to what our approach in training will take.

1.4b SYSTEM FEEDBACK MECHANISM

The idea of feedback is a very important feature of any system which inevitably has to respond to it's enviroment and maintain internal equilibrium. This property of systems is best described using the words of "Mayr" as follows; "a control system possessing monitoring feedback, the deviation signal formed as a result of this feedback being used to control the action of a final component in such a way as to tend to reduce any deviation to zero". "Mayr (1970)".

System feedback mechanism like system theories has no definite origin. This is more so due to it's universal applicability, ranging from the functioning of every living organism to human social systems, management practice and engineering. In biological realms homeostases is the feedback control mechanism in man and animals. In human and animal action processes, actions can be interpreted as a case of feedback control in which some sense function is applied resulting in overt or symbolic action.

A good example of system feedback mechanism is an electric fire controlled by a thermostat in (fig. 1.4) below.



Source; Edney P. J. (1972).

This set-up posseses a self control and self direction characteristics, as explained below - The air input gets in through the point "X" in the diagram and puts on the switch, resulting in the heating within the elements. The heated air comes out through output "Y" and at the same time sends a feedback through the thermostat "Z" to the switch thus regulating the

amount of heated air required at any given time within the boundary or system environment. Human institutions, like instructional systems can be considered in the same way as one of the many closed-loop feedback systems abounding in biological and physical environments. The social system has its control mechanism in the form of various sanctions imposed by society and its feedback mechanism is mainly interaction among actors in society. More specifically, various societial institutions can not do without some form of control or the other. Generally speaking, negative feedback will keep a system output stable whilst positive feedback in most cases produce instability. This is because, negative feedback impells the system governor to adjust and make amendments while a situation of non-feedback or constant positive indication may be misleading as to what the actual situation of the system is.

From our analysis so far, it is obvious that system thoughts dates as far back as man himself but scholarly work and application of the principles only gained recognition in the early twentieth century, spreading to the present place it holds today. The type of system in which we are interested in this study is unique and different from any other in the sense that it's output or goals are very difficult to measure or observe physically. In human systems performance can be measured by the healthy state of individuals and in commercial organization optimal system performance can be measured in many ways, for example, profit and losses situation. Educational system analysis on the other hand deals with human behavioural change induced by learning which is not an easy concept to grasp. For this reason, our major attention in the next chapter will be the operationalization of the concept of learning and how learning needs can be determined in any typical educational system. This will then lead us to general educational system analysis which spells out the various analytical steps necessary in any learning system.

CHAPTER 2

2.1 SYSTEM THINKING APPLIED TO INSTRUCTIONAL SITUATIONS

The last chapter presented a historical exray of system thoughts along with a classificatory scheme of system hierarchy, ending with a brief illumination of properties and operations of systems. In this chapter however, an attempt will be made to operationalize the various properties of a typical educational system.

The first step in analysing any system is to describe as specifically as possible the ultimate goal of that system. The system under study is "Extension training" and the aim of every form of training is learning. This logically means that our first major task will be the operationalization of the concept of learning which should lead us to the analysis of the various components of our learning system.

2.2 LEARNING DEFINED

The concept of learning is not easy to define, it's surface meaning not-withstanding, but we can say that the main focus of learning is on how humans develop from infancy to become adaptable and competently functioning within the social system. This process is dependant on a number of factors among which is the physio-logical growth of individuals which automatically brings with it changes in response to environment and situations. Our main focus in this work is not on the psychology of learning but on how various components of society can be effectively synthesized to produce individuals that can function efficiently as agricultural extension workers. Realizing the important part played by society as a whole in learning, "Gagne (1965)" has this to say, "....this enormous dependance of learning on environmental circumstances implies a great responsibility for all members of human society". The situation in which any individual is

placed, be it ordinary social interaction with others, concrete performance level or work situation eventually affects his knowledge, capabilities and actions.

At this point a definition of learning will be most appropriate. "Travers R. M. W. (1977)" defined learning by saying that "....it involves a relatively permanent change in behaviour as a result of exposure to conditions in the environment". Attempts made by scientists to grapple with how this change takes place in human learning, has given rise to two contending schools of thought, namely the reductionists and the non-reductionists paradigms.

The reductionists claim that simple basic forms of learning could be discovered which could constitute the elements of all learning, including the most elaborate and sophisticated, and that by this approach, such complex events like major discoveries can be reduced to the simplest form. In other words, reductionists scholars beleive that the science of

learning could stir a line similar to that in chemistry where the most complex of reactions or compounds can be understood by the analysis of the elements involved, their ratio of combination and the condition under which the reaction took place. As a result of this, reductionist scholars like "Gagne" are avowedly interested in "the conditions of learning" which formed the main theme of his book bearing that title. In this book he outlined eight main conditions under which learning takes place as follows; (a) Signal learning (b) Stimulus response learning (c) Chain type (d) Verbal association learning (e) Multiple discrimination learning (f) Concept learning (g) Principle learning, and (h) Problem solving learning. The underlying principle of all these learning types is that learning takes place under specific conditions as response of one kind or the other to a form of stimulus, signal or situation. Learning within an institution embraces a wide coverage of the types classified above.

On the other hand, the non-reductionist school captained by men like "Jean Piaget" argue that an approach which has been successful in chemistry developing it to the present status it holds in science may not be appropriate to the development of the science of behaviour. For instance "Piaget. J. (1977)" argues that "Psychologists of the present century make a serious mistake which damage their research by attempting to interpret simple behaviour elements in terms of the complex". Complex behaviour elements according to the non-reductionists, can only be understood according to the laws of complex behaviour and are not reducable to simple conditioning processes. A good illustration of this arguement is taken from outside the realm of behaviour science, the functioning of computers. "Piaget" argues that the computer is a complex machinary made up of small transistors working in combination but that the understanding of laws and logic of computer operations does not need any knowledge of transistor physics. He thus concluded that in the same manner, the understanding of complex human behaviour does not require,

first understanding of simple condition reflexes. Their main stand on learning is that, "at any stage in human development, structures develop that permit the performance of certain logical or semi-logical operations" "Travers (1977)".

At this point it surfices to say that we are not concerned with the merits or de-merits of any of these schools of learning but to admit that from whatever angle learning is looked at the idea of pattern can not be overlooked. Whether we accept Gagnes learning typologies or Peaget's structural approach to learning, they all end up bringing out the orderly pattern which exists in this essentially cognitive domain of life. This makes the job of both the educational system analysist and manager simpler by the existance of baselines. These baselines include the following; The analysist's need to know what the present knowledge pool in an area is and what should it be ideally in any given field. In short what we may term educatinal need

analysis. Having defined the concept of learning, we will now proceed to the very important issue of educational need determination.

2.3 EDUCATIONAL SYSTEM MANAGEMENT PROCESS

The management of any learning process is considered successful only when the designer who may be an administrator, a teacher or curriculum specialist is able to ascertain the needs of the learners, identify their problems, and fashion an educational system which is responsive to these needs. This is the primary responsibility of management not only in training but also in industries or even Government beaurocracies. Supporting this claim, "Kaufman R. A. (1972)" said ".....The job of any educational manager is to plan, design and impliment an efficient and effective learning system, responsive to the needs of the learners and society". For this to be achieved, the first major task of the planner who we may also call a learning manager, is what most authors seem to unanimously call "task analysis". Others in the field of educational system management like "Cook (1968)" identifies two major management functions, namely; "a management sub-system". "Davis I. K. (1971)"

on the other hand identifies three main components for analysis in any educational system as follows;
"(a) Topics analysis which involves a detailed analysis of the interlectual task to be achieved, such as the principles and laws to be learned (b) job analysis, which involves a detailed outlay of the physical task to be performed on mastery of the topics and (c) which is similar to "b" but differs only in the sense that it goes further to analyse how the job will be accomplished".

The best example of educational system analysis which reflects the ideal system thoughts outlined in chapter one is the one presented by "Kaufman R. A. (1977)" as follows;

(a) identification of priority needs and associated problems.

(b) Determine requirements to solve the problems and identify possible solution strategies and tools from alternatives.

(c) Selecting solution strategies and tools from alternatives.

(d) Implement solution strategies, including the management and control of the selected strategies and tools.

(e) Evaluation of performance effectiveness based on the needs and requirements identified previously.

(f) Revision of any or all previous steps at any time in the process to assure that the educational system is responsive, effective and efficient.

From the steps set out above it is obvious that the management of any educational system is not a simple task. For purposes of simplification, these six steps will be devided into two broad areas namely problem identification and resolution which looks like a problem solving process shown in (fig. 2.1) below.

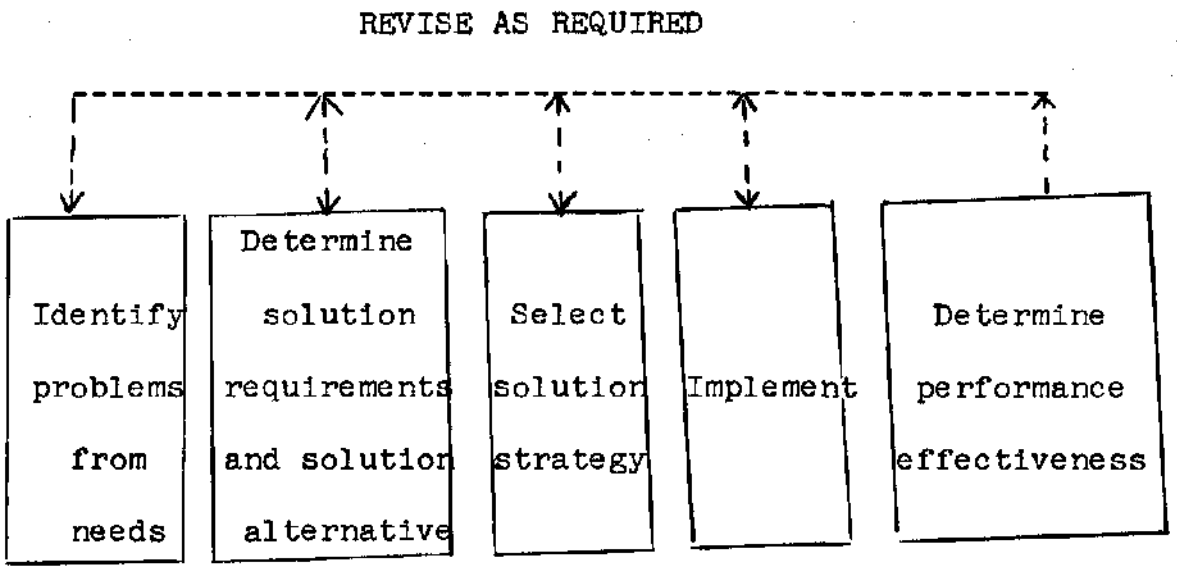


Fig. 2.1 A general problem solving process.

Source: Kaufman R. A. (1977).

Educational need identfication should not be based on hunches or mere experience of the system analysts but on established documented needs exsisting at any time. This can be done by measuring through social survey methods, what the problems in training are at any given time, and what the needs of the society that use the services of the trained personnel are. The trainees needs should not be

over-looked however. The importance of this process can only be understood when one notes the load of accountability heaped on teachers, curriculum specialists and the knowledge system as a whole by society these days. We now turn to the important task of how an educational system learning needs can be determined.

2.4 DETERMINING LEARNING NEEDS

Determining the needs of a knowledge system is as tasking as the determination of the needs of any complex organization but if any degree of efficiency is to be achieved this exercise should form an indispensable part of the analysis. Even in the human system, people often go to doctors for regular check-ups, so as to ascertain their state of health and work towards the ideal or normal state. In industries and government bureaucracies, continual appraisals of the state of affairs so as to strive for the ideal state is a regular feature. In support of this claim "Kaufman R. A. (1972)" has this to say; "the identification of needs is a discrepancy analysis that identifies the two positions of: where are we now and where are to be, which specifies the measurable discrepancy or distance between these two poles".

The difficulties involved in this discrepancy

measurement are manifold. In educational systems unlike in production industries, output is not measured in numerical terms such as straight forward demand and supply but involves relative intrinsic satisfaction of the learners and societal expectations. It is thus obvious from this argurment that any attempt at establishing the learning needs of students will be with all the pitfalls of social science research which include among other things, the multiplicities of paradigms which inevitably render research results conflicting and control almost impossible. These facts not-withstanding every need assessment in educational systems must have these three characteristics stated below,
(1) a representative data which reflects the learners true situation and that of his society, both as it is now and could and should be in future. This might be done through any method of data collection and must be periodic and continous so as to guide projection into the future. (2) Every statement of needs should always be taken as tentative and liable to constant review. This will subject the system

needs to regular and interval evaluation. (3) any discrepancies, identified as a result of these two steps stated above, should be stated in terms of actual products, behaviour and ends not in terms of abstract means or process.

This means that the analyst should have a clear picture as to what the differences between "needs, wants, desires and requirements are". As "Razik T. A. (1972)" puts it, "when we use the word 'need' as a verb we are usually risking our jumping into a solution before defining a problem". The only way to avoid that pitfall is by including all the partners in education in the process of establishing educational needs. These partners include; the trainees, representatives of the community, parents and the educator who may be the teacher that does the training. In this way the mistake of having a biased training design could be avoided.

Educational needs could be of two main types,

namely "felt needs" which we may term, opinions of the various people involved in educational design and "hard needs" based on the empirical world of all partners in educational systems. Hard needs differs from felt needs mainly on the grounds that they are established only after information has been systematically collected from all the partners involved in educational design and analysed with all the precision necessary for any scientific research. After the survey might have been carried out, the next most important step would be to match the similarities and dis-similarities of all the partners in learning, so as to find out how far their perceptions differ regarding educational needs. In the words of "Kaufman R. A. (1972)"

> "This type of analysis is simply a determination of of the compatibilities and incompatibilities that exist in obtained data. If the partners have basic disagreements in values, goals and/or objectives, this will be spotlighted by an analysis of matches and mis-matches in obtained representative data. If there are

"matches it is probably safer to proceed; mis-matches' indicate that better understanding should be obtained which should result in greater congruity between values, goals and objectives".

This general discussion on educational need determination will not be complete without one highlighting other models or approaches to the exercise. The models used by, "Harsh and Kaufman, (1969)" seem to be very reflective of actual live situations and they include the following; "The deductive, inductive and classical" models. The main difference between these three models of need assessment in education is in terms of their starting point for the determination of goals and objectives of education. Educational system planners that use the inductive model approach, base their design of system output on information received from all the partners in learning. Such as, their goals, expectation and perceived outcome in relation to the currant performance of learners in

in their community. Any discrepancies between the existing educational goals and actual performance of the products of the system. This could be termed a reconciliatory approach since it tries to reconcile actual needs with the broad goals of education.

The second model is the so called deductive approach which starts need determination from existing educational goals of any learning system. Next a survey is carried out to determine what changes partners in education would want, then any discrepancies between existing educational goals and changes needed by educational partners forms the basis for the detailed objectives and needs of system.

The last model of need determination is the so called classical type, so named for its popularity among most educational system planners today. It differs from the other two approaches in the sense that users of this technique proceed in setting educational goals, needs and objectives without any

empirical data which indicates the feelings of the learners, educators, or the community. Educational systems are designed and goals, needs objectives are set based solely on the personal whims of a group that may have little contact with all the components of the system. This model has the serious disadvantage of being very insensitive to other system components, thus making feedback difficult.

In an agricultural training system, like in most others the first model is not recommended but any choice between the others, is a factor of the community and educational agency to be served.

The analysis of any educational system can not be complete without an inquiry into the mission, function and task of the system. This helps not only in rigorously establishing system goals but also in bringing out inter-relationships between sub-systems. The next chapter takes up that task.

CHAPTER 3

3.1 MULTIPLE ANALYSIS OF SYSTEM MISSIONS FUNCTION AND TASK

If the indispensable objective of an educational system which include, stability, growth and interaction are to be successfully realized, the analyst will use the need determination technique outlined in the previous chapter only as a step towards gaining a clearer picture of system goals. It is these goals that the analysis of system missions function and task turns to spell out in clear terms while highlighting the main processes of interaction, growth and stability - at the same time.

Educational system mission could be defined in the words of "Kaufman R. A. (1972)" as "an overall job, a product, a completed service or a change in the condition of something or somebody, that must be accomplished". He went on to say that mission analysis helps us to determine "where we are going,

how we know when we have arrived and what the major steps are to get from here to there". This process is not in any way simple to accomplish since it can only be built on acquired analytical data which is complete, correct and current. Educational mission can be seen as having two main components namely, mission objective with its associated performance requirements and mission profile.

By mission objectives we mean a clear and precise statement which is expressed in performance terms defining the outcome of a training program. This step is very necessary if we are to be able to translate our intents into some measurable criteria. An example of a good mission objective for educational system planning could include such directives as statement of this form:

1) Build a new College of Agriculture.

2) Determine learners' needs in Kano State area.

3) Employ new teachers.

4) Develop an instructional media centre.

Mission objectives are supposed to be performance objectives where outcomes can be specified in measurable terms but any casual observer will notice that the objectives stated above are not in any way clear nor precise enough to enable the measurement of outcome in the system being planned. This is because it does not show how a completion of the programme will become obvious, by when it is to be done and the criteria to be used in determining when the outcome has been achieved. In the words of "Mager R. F. (1961)" "therefore, the most important characteristics of a useful objective is that it identifies the kind of performance that will be accepted as evidence that the learner has achieved the objective". In this respect, are hypothetical objective restated in a more precise form would read as follows;

1, Build a new College of Agriculture in Kano state by 1981.

2, Determine learners needs in agronomy, extension and animal production.

3, Fill in any vacant posts in the College.

This illustration as can be seen highlights how the administrative, managerial as well as the learning aspects of an educational system can be objectively stated. When completed a training mission objective should therefore reflect these four conditions namely;

(1) What is to be done to demonstrate completion.

(2) By whom is it to be done.

(3) Under what conditions is it to be done.

(4) What criteria is to be used to determine if it is done.

Statements of objectives are useful only if they contain performance criteria and a base for evaluation. In this way, the expectations, goals and needs of all facets of the system will become very obvious. This was what "Kaufman R. A. (1971)" meant when he said that "objectives must communicate successfully to all users and evaluators all the conditions for results and must contain the basis for evaluation, they must focus on the learners, and must be in measurable performance which are valid and should leave no room for confusion". This is possible only

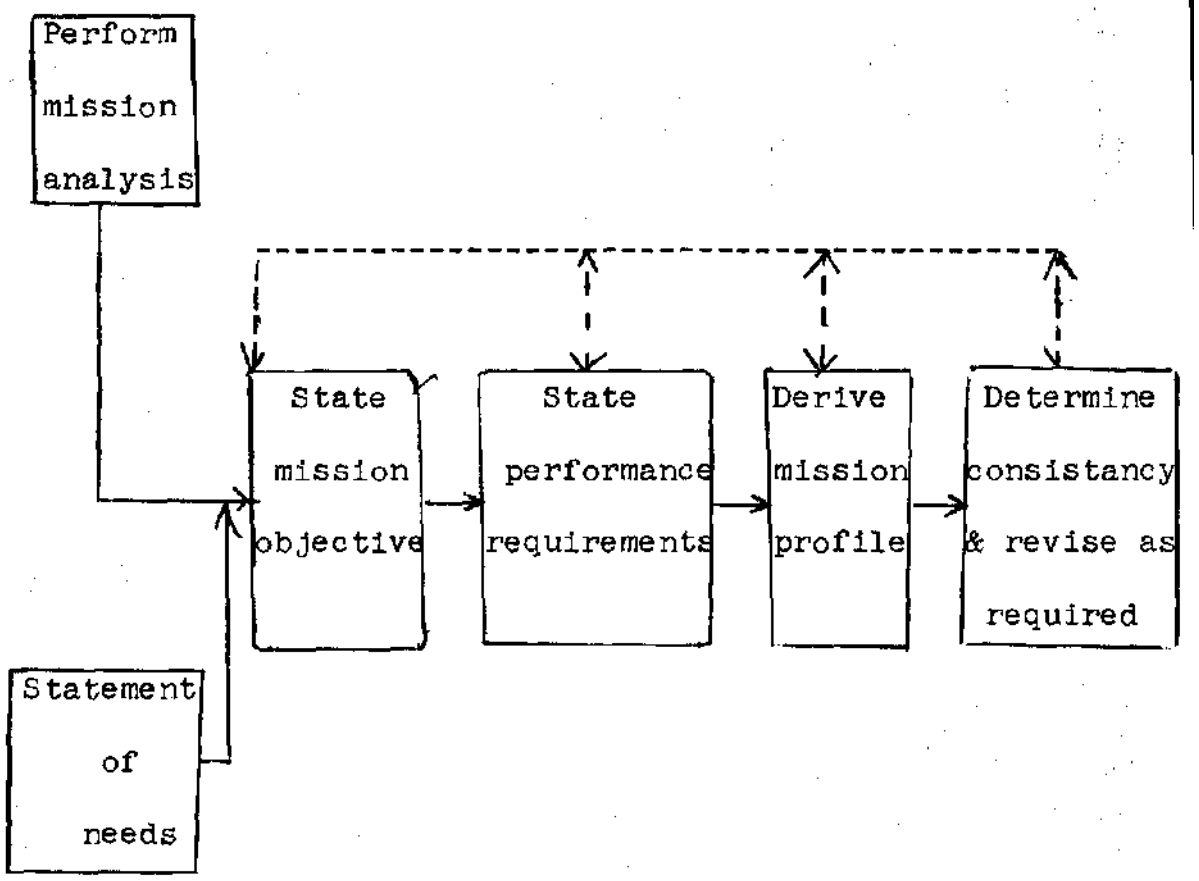
if they contain criteria by which the terminal success of training mission may be measured. This is clearly illustrated by the situation in the Northern States of Nigeria since the mid 1970's where agricultural extension training courses were set up with seemingly clear objectives but in most cases lacked criteria by which terminals of training could be measured. This has given rise to the proliferation of training programmes that are difficult to evaluate and hardly give any feedback on the performance of system's products. The solution to problem lies in having alongside a good set of training objectives what "Kaufman R. A. (1971)" terms as "performance requirements" of a training mission which specifies how the success or failure of the mission may be measured. The task which this process entails is enormous but the ultimate aim is that it has to specify what the product will look like or do and state the context or grand rule, such as the cost, personnel and enviromnent. It may have to entail the listing of all performances required of the system as set out in the objectives.

The next step in the analysis of an educational system mission after having set a clear objective with defined performance requirement is the sequential ordering of objectives. This helps to place elements of the mission in order of priority, and guide the educational system manager in his role of exacting optimum performance from the system. In other words this logical ordering of functions of an educational system is what we term as the "profile" of the mission. Mission profile therefore tells us the thing that must be done to accomplish the overall job in logical sequence. Following this, the next question that comes to mind is how an educational system mission is derived. In our previous discussion in this chapter we had outlined through the method of mission objectives and performance requirement derivation, how a clearly stated educational mission should show what the main focus of a training programme should look like. The main task of a mission profile therefore is to show how these identified objectives and performance requirement can be achieved. Mission profile

therefore as "Kaufman R. A. (1971)" says of it is "a management plan identifying what is to be done to get from the 'what is' area of our need assessment state to 'what should be' as stated in our objectives and performance requirement".

The derivation of a mission profile is therefore an interaction of the need assessment carried out in the previous chapter, mission objectives and performance requirment just outlined and a process of detailed and careful listing of function in logical order. This process should be continued to make sure one has moved from the first to the last function of the mission profile required to achieve the objectives and performance requirement. As in the case of need assessment we, need to check for consistancy within our objectives, performance requirements and mission profile to make sure everything necessary has been included and is in logical order. The pattern of interaction just described is illustrated in (fig. 3.1) below. The indispensable

feature of feedback and revisibility is also shown in the diagram.



(Fig. 3.1) A diagramatic representation of mission analysis, showing feedback and revisibility in the system.

A successful analysis of the system mission should lead logically to function analysis which forms the topic of the next section.

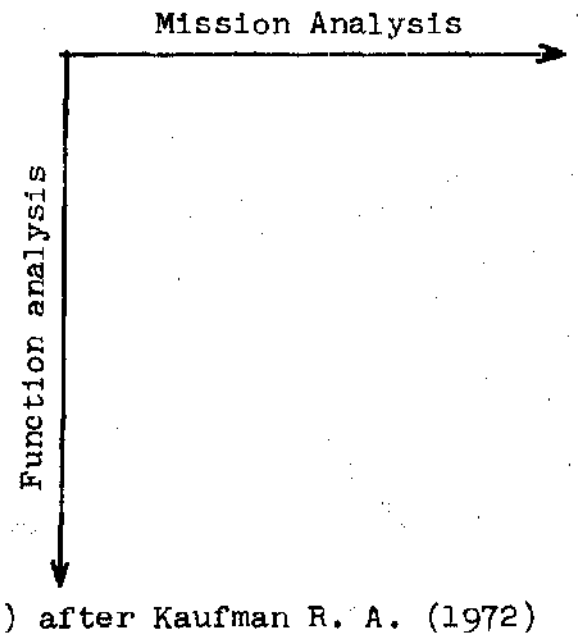
3.2 FUNCTION ANALYSIS

A statement of an objective is useful only to the extent that it specifies what the learner must be able to do or perform when he is demonstrating his mastery of the objective. However, since no one can see into another's mind to determine what he knows, we can only determine the state of the learner's interlect or skill by observing some aspects of his behaviour or performance. In the attempt to accomplish this task the system designer does not stop at mission analysis stage which states the objective in gross terms with its performance requirement and mission profile but goes on to the stage of funcition analysis. In the words of "Kaufman R. A. (1971)" function analysis could be defined as "a collection of required jobs or tasks necessary to achieve a specified objective or bring about a given product or outcome".

Function analysis as must have become obvious

from the introductory statement so far is an extension of planning that started with need assessment, mission objectives and performance requirements and mission profile earlier outlined. The major difference between this stage and the others is that it defines in fuller details and goes on to all the minute extent of identifying the terminal behaviour that would be accepted that the learner has achieved the objectives. This is supported by what Mager said in these words; "to state an objective that will successfully communicate your intent, you will sometimes have to define terminal behaviour further by stating conditions you will impose upon the learner when he is demonstrating his mastery of the objectives. Mager R. F. (1961)". In this respect we can say that any function analysis could be said to be the identification of an array of functions and sub-functions including the determination of interrelationship required to achieve a mission. In short function analysis could be seen as a vertical

expansion of mission analysis in the sense that if we view the relationship between the two in terms of a matrix, with the mission analysis forming the top of the matrix and function analysis as the rest, the latter could be seen as a filling in of details including the specification of the requirements and inter-relation among identified sub-functions for each element in the mission profile. This is illustrated in the diagram below:



(Fig. 3.2.) after Kaufman R. A. (1972)

One very important element in any system analysis is the careful identification of the inter-relationship between parts or sub-systems. System analysts generally use the term "interaction" to denote this relationship. The success of system analysis is dependent on the careful identification of the type of interaction most suitable for the system. Thus starting from overall function of the system which becomes obvious from the step of mission analysis and profile, educational system analyst defines in detail what each function level of the system should be and makes sure that the system function so identified is consistent with all other steps in his analysis. Under each main function, a profile or an array of lower level functions are also identified.

A hypothetical illustration at this stage will help to make our steps so far clear and less abstract. To understand levels of function analysis we could consider an agricultural extension training in-

stitution where the highest level to be analysed may be the entire agricultural system of the country in question, the next level is the institution's training objectives in relation to the national agricultural situation; a still lower level is the training needs of the particular environment of the institution and the lowest level may be individual student's training needs. This analysis could continue to the lowest possible level necessary. One of the critical results of performing a system analysis in general and a function analysis in particular is that we are seeking to free ourselves from the possible straight-jackets of the past with new and better ways of doing things. If analysis as "Razik T. A. (1972)" puts it "is the process of breaking things down into their component parts and noting the interaction between the parts" then every good analyst will start his task by listing the constituent components of a system in logical coherent sequence and next to this will be the determination of analysis level. By the determination of analysis level we mean the identification of true

constituents of function components. For example, if we agree that the phrase "go to sleep" is a function, certain acts like preparation of ones bed, brushing our teeth, changing into a night dress and lying down are all constituents of this function but some of them are more critical to the task of going to sleep. The extent to which we identify and logically order these function constituents determines our analysis level. Some other educational system analysts use the term-inologies such as "dropping down" and "breaking out" to refer to the same process of detailed analysis of educational function.

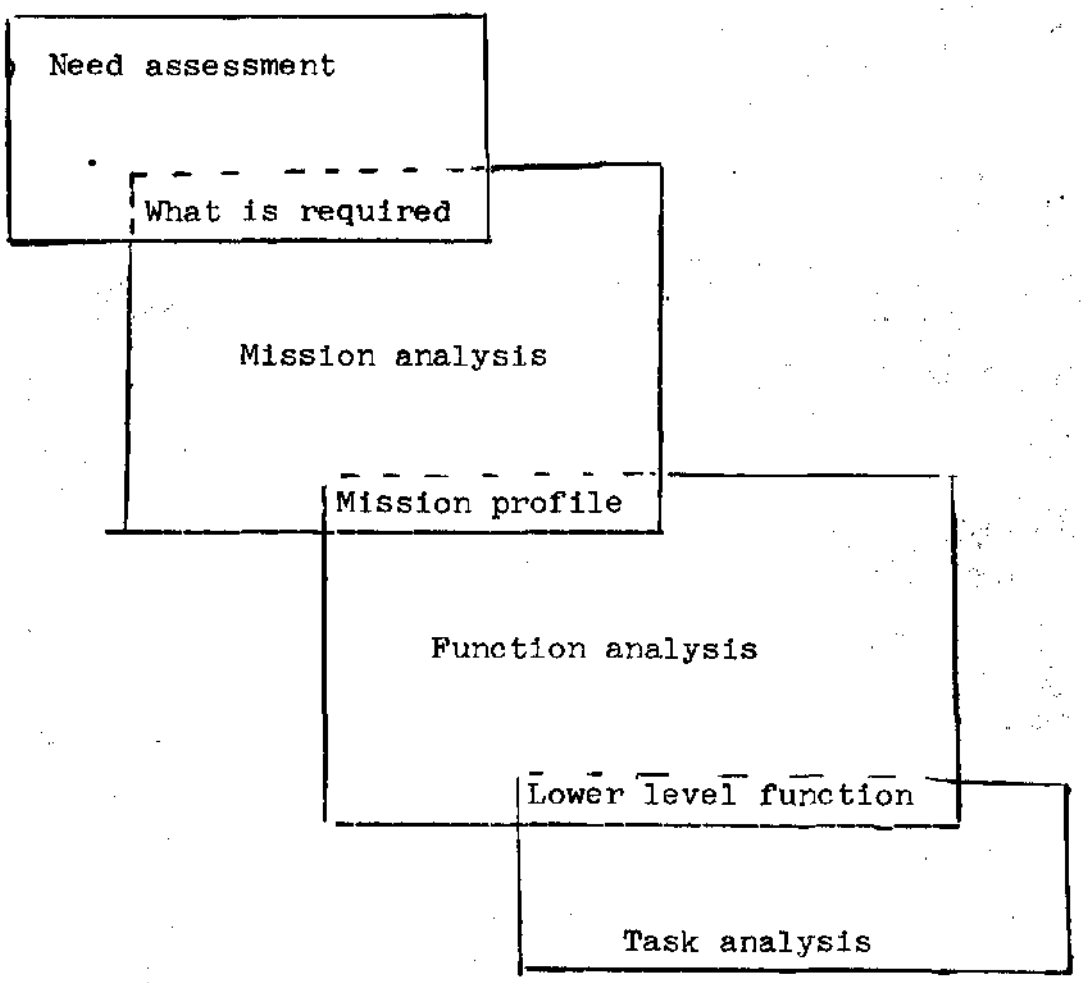
The success of any educational analysis is to a very large degree dependant on whether the ed-ucational manager is aware of a constant checking back through previous steps and data, to the original needs statement to ensure that the final identification of "what" will be internally con-sistant and have extenal validity. In other words it must be determined that all the functions

are compatible with one another as well as with the needs, the problem and other functions at all levels. Having reached this stage of our analysis, the next logical step is the compilation of the units of performance that make up a function, what we may term task analysis. This forms the subject of the next section.

3.3 TASK ANALYSIS

Once the learning needs of any area has been determined followed by the analysis of educational mission and functions as previously discussed, the final step in any educational analysis is the task to be performed. Task analysis may be defined in the words of "Kaufman R. A. (1971)" "as units of performance which when collected constitute a function". Other authors such as "Bech and Magar (1967)" term this step "task listing" or "task detailing". The difference between the other stages of analysis and this one is only a difference of degree rather than of kind in the sense that each stage brings out more details about the system while the task analysis stage is the lowest level of details in a system analysis. In this respect the success of any educational system dependens on the extent to which the analysis of the task indicates what must be done to get a higher order function

accomplished. The diagram below shows the nature of relationship between all the analysis steps discussed so far.



(Fig. 3.3.) The basic steps of analysis showing the linkages or joining aspects which relates the levels.

Following the model used by "Kaufman R. A. (1971)" we can say that the two basic steps on task analysis includes the identification of the steps involved in accomplishing an overall function and the determination of characteristics of all the tasks to be performed, their requirements and their context and putting this in a time order sequence. The former could be further sub-divided into two more steps namely, task listing and description. Task listing could be said to mean the same thing as the specification of the minimum acceptable performance for each objective which states the performance standard against which to test an instructional program. The listing of the tasks or units of performance that constitutes a giving function can be thought of as a check list, a sequencial listing of tasks that taken together will yield the overall function from which they derive. As "Magar R. F. (1967)" puts it "probably the most obvious way to indicate a lower limit of acceptable performance is to specify a time

limit where one is appropriate". This will set the items in sequence and order them in hierarchy. Task listing like the other analytical steps so far discussed avoid the determination of how the task is to be done. It is also at this stage that data on how frequently a listed task need be performed should be collected followed by data on the importance and learning difficulty of each task. All of which help in the curricullum design phase.

When the system analyst has successfully listed the task in order of importance, the next step is to determine the salient characteristics of the tasks involved or what we may term task description. This may include such important considerations as the environment in which a series of tasks is to be performed, health and safety requirements, the time requirement for beginning and ending of tasks. For this reason the task description generally takes the information from the task listing, arranges it on a time based

scale and identifies the outstanding characteristics of the task and the context in which it is to accomplished. At this point in our analysis of training systems we have succeeded in indicating all the parts and the relationship between the parts of accomplishing a given mission by reviewing in layers the sub-systems or portions involved in mission accomplishment and the requirements for performing each. We will now turn to techniques of evaluating and measuring the performance of a training system.

CHAPTER 4

4.1 EVALUATION AND MEASUREMENT IN TRAINING

Some form of evaluation and measurement is inevitable in training as it is in all fields of activities where judgements need to be made, however simple or complex the consideration may be. In the field of agricultural extension training, this need becomes inevitable when we notice the weight of accountability heaped on organisations and institutions involved in extending agricultural innovations to rural farmers.

The verb to evaluate carries various meanings to the layman and social scientists but the key meaning of evaluation from a methodological point of view, according to "Suchman E. A. (1969)" are as follows:

(1) "A planned programme of delibrate intervention, not just any natural or accidental event.

(2) An objective or a goal which is considered desirable or has some positive value, not

simply whatever change occurs and

(3) a method for determining the degree to which the planned programme achieves the desired objective".

Seen from this view point, it looks as if the main task of evaluation is to pass or fail a programme which should not be the case. Evaluation study should attempt to find out why a programme was or was not a success by analysing such factors as:

(1) The attributes of a programme that makes it more or less successful.

(2) The population exposed to the programme in terms of which sub-groups are reached and which affected.

(3) The situational context within which a programme takes place, such as auspices, locale, competing programmes and public opinions.

(4) The different kinds of effect produced by the programme such as, cognitive, attitudenal or behavioural, long or short

terms, unitary or multiple, including special attention to any negative side effects. In this sense, evaluation involves more than judging, it also encompasses research on conditions affecting success or failure.

We can see from our discussion so far that for any evaluation study to produce dependable and useful results, it needs a very high degree of scientific approach so as to be able to test hypotheses concerning the relationship between independent or "causual" variables and dependent or "effect" variables. Our concern in this section however is not in evaluation in general but as it applies to the field of education in particular. More often than not, the terms evaluation and measurement are used as synonymous to each other. As a result, we hear educators and teachers in particular say that they are measuring achievement or evaluating achievements in their pupil with little regard for the difference in

meanings. In the words of "Gronlund N. E. (1967)", "this use of the two terms distinguishes evaluation as a qualitative description of pupils' behaviour, (check lists, rating scales etc.) as opposed to measurements which are quantitative descriptions (test scores)". He went on to say that from an educational (training,) point of view, we could define evaluation as "a process of determining the extent to which educational objectives are achieved by pupils".

It is obvious that the main purpose of the training programmes for middle level agricultural extension workers in the developing world is among other things to change pupils' behaviour in the directions considered desirable for effecient diffusion of agricultural inovations. If this very important goal is to be achieved, the steps in educational system analysis earlier discussed are indespensable and it is only after the steps have been followed that any meaningful evaluation of a training program can be done as they make what is to be evaluated obvious.

4.2 EVALUATION MODELS AND PROCEDURES

Evaluation models and procedures vary according to the field of application and we will discuss them in general before focusing on the area that concerns this work. Following "Gronlund N. E. (1967)" we can classify evaluation either as "qualitative" or "quantitative". When we say that an evaluation technique is quantitative we mean that type whos result can be reduced to numerical scores or as qualitative because their results can be expressed only in verbal descriptions the other two approaches to the classification of evaluation procedure; (1) "in terms of aspect of behaviour to be evaluated and (2) in terms of evaluation techniques". Lastly, we can follow the two broad classifications of "Schulberg P. E. and Baker F. (1968)" which includes the so called "goal attainment" and "system models" of evaluation.

The goal attainment model of evaluation has

many of the characteristics of classical research and lays emphasis on the conception of evaluation as measurement of the degree of success or failure encountered by a programme in reaching predetermined objectives , social scientists who use this approach to evaluation beleive that if programme objectives can be clearly defined, and if possible with the researcher as a party to the team setting the objectives then appropriate methodology and criteria can be selected which can successfully test the degree of programme success, the problem with this approach is that usually the researcher is not a party to the team setting programme objectives and as a result has to turn to the administrator for a statement of the goals to be used as criteria and as "Etzioni A. (1960)" noted "organisational goals, particularly public ones have an illusionary quality in that they may never have been intended to be realised". This state of affairs usually leads to situations where the researcher sacrifices his work for "ideal" objectivity. Under this condition,

programme evaluation has little impact on organisations since the researcher and the administrator are looking at organisational goals from different angles. Another serious limitation of this approach is that since it is a central assumption that specific goals can be evaluated and modified in isolation from other goals being sought by the organisation results are usually rendered fallacious if not artificial. Organisational goals and objectives are never in isolation and should always be seen as a "whole".

The system model of evaluation is unlike the goal attainment one in that it does not seek to establish the degree of success or failure of specific objectives, rather it attempts to establish the degree to which organisations realize its goals under a given set of conditions. As "Etzioni A. (1960) puts it, " it recognises that an organisation fulfills at least four important functions for survival. In addition to the achievement of goals and

sub-goals, the system model is concerned with the effective co-ordination of organisational sub-unit; the acquistion and maintainence of necessary resources and the adaption of the organisation to the environment and its eternal demands. The key word here is, under the given condition, how close does the organisational allocation of resources approach an optimum distribution".

The important advantage of this model over the goal attainment procedure is its all encompassing approach which allows for the operation of feed-back mechanism in the system being evaluated. It is easier under this procedure for organisational actions to be reported back to the organisation and used as basis of comparison for desired performance. In the field of agricultural extension training institutions and that of the trainees on completion of the course. This advantage not withstanding, the procedure is more exacting in terms of the efforts and resources needed by the researcher

to carry out evaluation study using this method. Instead of simply identifying organisational goals and proceeding to study whether they are attained or not, the system model requires that the researcher determines what he considers to be a highly efficient allocation of means. To be able to do this successfully, he requires a deep knowledge of the way organisations function.

Whatever procedure we follow in evaluation, information has to be collected and processed based on sound hypotheses and study design. We will now turn to discuss some three general methods which designates the main categories used in classifying types of evaluation techniques in training.

4.3 EVALUATION METHODS

Evaluation methods in training can be discussed under the following headings, namely;
(1) Testing procedures (2) Self reporting techniques and (3) Observational techniques.

Testing procedures may be formal or informal achievement tests administered to sample pupils' behaviour at a given time, they are said to be formal when the test is constructed, scored and interpreted by a specialist and informal when it is designed internally by a trainer-teacher. In agricultural extension these two methods of evaluation procedure are indespensable as they can come in handy at different times. The formal method could be very useful for evaluating the work of extension workers on the field at periods of short inservice courses. Another way by which pupils' achievement can be evaluated through written tests is either by essays or objective type examinations. The only disadvantage of essay tests is that it is

open to subjectivity by the scorer unlike in objective tests where every scorer can obtain the same result.

We can also classify acheivement tests by the function they are supposed to perform, on the basis of that they can be labelled as; mastery tests, survey tests or diagnostic tests. A mastery test measures the knowledge, skills, and other learning outcomes that all pupils must acquire. It tests basic skills such as is required of a doctor to perform his work efficiently. This type of test usually sets a minimum which all students must achieve and any performance below this minimum would subject the students to further drill until he attains the set standard. Training in fields where any simple mistake results in high cost either in terms of resources or human life always demand evaluation of this type. On the other hand,in survey tests the emphasis is on general performance of all pupils involved in a training programme.

The aim of a survey test is to find out the average performance of students so as to have a base for future comparison. In diagnostic scores on the other hand, the main interest is with the identification of disabilities and deficiencies of individuals as a result, total scores are of little or no interest.

The second major channel of gathering information for evaluation in training is the so called self reporting techniques which focus on eliciting individuals' opinion, intersts and attitudes on some specific issues. Information is obtained by direct questioning which may be structured or unstructured interviews. In unstructured interviews, questions are guided by a central purpose while the development of the interview determines the type of questions that are further asked. In structured interviews however, a form is generally followed while all respondents are asked the same questions. When hypotheses have been developed followed by a

good study design, then questionaires can be constructed for this type of evaluation procedure. A good example of the self reporting technique of evaluation in agricultural extension is the regular meetings of field level workers with their divisional agricultural officers for the purpose of reporting field situations and achievements.

The last of these procedures of information gathering for evaluation is what we may term observational techniques. This method differs from the others in the sense that there is little effort made on the part of the pupils in the recording of information for evaluation. Pupils just carry on their usual daily routine, this is observed and recorded by a researcher and on the basis of this, evaluation is carried out. In the words of Gronlund N. E. "reliable information about an individual's typical or usual behaviour is best obtained from persons who have observed him in a veriety of situations". Included in this category of observational techniques are;

sociometry, rating scales, checklist and anecdotal records.

We have so far discussed general procedures and models of evaluation and if these are to be seen as more than mere collections of techniques for obtaining informations about pupils then they have to be based on sound principles such as the following: (1) Giving of priority place to the determination and classification of what is to be evaluated. (2) Basing the selection of evaluation technique on the purpose to be served by any study, each evaluation technique is appropriate for some purpose and in-appropriate for others, and (3) realizing that no single evaluation technique is adequate for appraising the extent to which educational objectives are being realized. Following this, Gronlund N. E. rightly said that "one reason why we have so many different types of evaluation procedure is that each procedure provided unique but limited evidence on some aspects of pupils'

behaviour". From the fore-going points therefore, we see that evaluation is almost indispensable in most training programmes. This becomes most crucial especially when we are interested in pupils' performance both within the institution of training and field work.

The next chapter therefore attempts an application of the concepts raised so far in the field of extension training in the Northern State of Nigeria.

CHAPTER 5

5.1 RELEVANCE OF SYSTEM APPROACH TO MIDDLE LEVEL AGRICULTURAL EXTENSION TRAINING IN THE NORTHERN STATE OF NIGERIA

In this modern world where the rapidity of technological change is so high, a system approach is almost indispensable in most of life's undertakings. The cost of newly developed technology, policy decisions and operation of organisations are continously rising so that the consequences of bad decisions in development planning are becoming increasingly expensive. A system approach to the training of personnel charged with the diffussion of agricultural innovations to rural societies demands that a piecemeal approach be abandoned and an all encompassing approach followed. In this regard, extension training requires careful study in order to make efficient use of resources in the form of manpower, capital and material inputs. The lack of such careful studies as has been the case in the Northern States, where

middle level extension training institutions have sprung up in such rapidity in the last five years giving rise to the duplication of efforts, capital and training resources in general. The conceptual chapters of this work has dealt in detail with what constitutes the best procedures in the application of system principles and models to training.

It is known to scientists that millions of systems are in inter-reaction with each other either directly or indirectly for the conservation, modification and improvement of the earth's eco-system for the well being of mankind. The eco-system forms the basis in which man must operate in order to grow his food, build his house and carry out the many essential activities for successful existence. This means that farm systems develop within the eco-system continuous inter-reaction being maintained through the rural development system operating within the eco-system with man controlling as engine governor, the amount of

transformation from the eco-system into the rural development system. Agencies of an array of organisations operate within the rural development system in order to optimise the efforts of farm families. In Nigeria these agencies include the universities, research institutions, states-ministries of agriculture and extension training schools. These different organisations have developed techniques in order to communicate effectively with the client system. Better understanding of the client system with closer inter-reaction of all the components will result in harmonious working of sub-systems. This may require a multi-disciplinary approach by groups of specialists in order to bring about rural transformation.

At our disposal to carry out this operation systematically are modern techniques of system analysis, system design, with the accompanying technique of project implementation, block boxes, matrices and networking are all useful tools in the thorough study of any system. These bring to

light system variables of paramount importance such as inputs, cost transformation, output and time. Consequently, it clears the path for effective decision making as to cost effectiveness of projects, determination of training needs for an area etc. and obliterates uncertainties as to viability of plant projects.

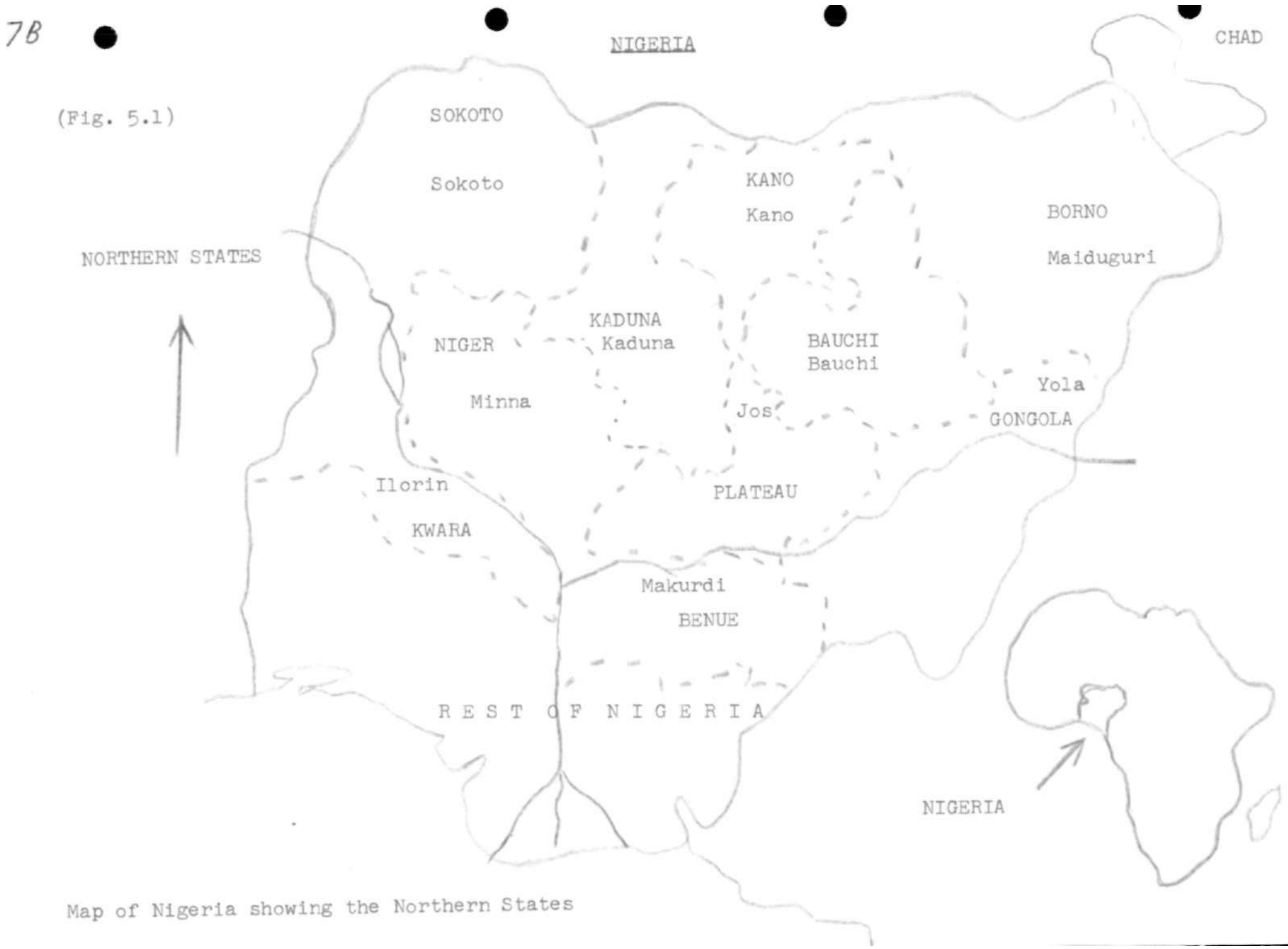
System thinking is applicable and beneficial to all services directed to the rural population as it shows the way for optimising results for the betterment of the community and the country as a whole. In order to have a clearer understanding of the relevance of system approach to the field of agricultural extensions training, we will now try to show the state of socio-economic and educational development in Nigeria in general and the Northern States in particular.

5.2 MIDDLE LEVEL AGRICULTURAL EXTENSION TRAINING IN THE NORTHERN STATES OF NIGERIA

The former Northern region of Nigeria now comprised of ten States since the restructuring which took place in 1976 by the then ruling Military government of "late General Murtala Mohammed". It is this part of Nigeria that we will attempt an application of the concepts and models revised so far in our system analysis. It will be helpful to have a background picture of the area in question as this will in no small way aid our understanding of the discussion that follows (fig. 5.1) below, is a map of Nigeria showing our area of focus. Any background picture of the Northern States which does not start from a general socio-economic highlight of the whole country will be rather arbitrary. In this regard, we will spend some time in that area.

The Federal Republic of Nigeria with a population of over seventy million (1975), a land

(Fig. 5.1)



Map of Nigeria showing the Northern States

area of 356,669 square miles where over 70% of the labour force is employed on the land is predominantly an agricultural country and still has agriculture as the mainstay of the economy, the "oil boom" notwithstanding. Refering to this situation, the West African Magazine says that;

> "Primary produce untill the advent of oil was 'life and blood'. Even today agriculture is still the mainstay of our economy if we consider that the impact of oil falls directly on only 20% of the population".
>
> (West Africa No. 3110, P315 14th Oct. 1977)

The agricultural industry contributed about 70% to the gross domestic product (GDP) at independence (1960) but this percentage has gradually slimmed to 49% (1974) with the years (Federal Ministry of Econs. Dev. 1975).

The average national income in the agricultural sector is much lower than in the non-agricultural sectors - e.g. industries - (West Africa 1975).

The table below shows that;

> "The income position of the rural community deteriorated relative to their urban counterparts between 1963 and 1970 and of course remained persistently lower in absolute terms. Rural income as percentage of urban income ranges between 20% and 60%".
>
> "Olatunbosun D. (1975)"

Agricultural development on which the economy heavily leans apart from the temporary oil boom has lagged behind rapid development in other sectors such as the construction industry, and education, to mention a few. To aggravate the situation, Nigeria is today confronted with a rapidly growing population (the rate being about 2.5-3% annually) and less food production with a high rate of inflation.

In full realisation of the expected role of the agricultural industry in the socio-economic development of the country, all the governments of Nigeria (19 States structure with the Federal Government at the centre, Feb. 4th 1976) in recent years are

eagerly emphasizing the need for greater mobilization of resources at all levels, for the rapid development of this sector of the economy than there has been earlier.

AVERAGE INCOMES BY SOCIO-PROFESSIONAL GROUPS

(1963-70)

	URBAN			RURAL		
	1963	1970	Ratio	1963	1970	Ratio
Professional, Managerial and Technical	3,686	3,930	1.07	974	1,034	1.06
Clerical and Minor Professional	476	628	1.31	308	380	1.23
Skilled/Semi-skilled	328	476	1.45	196	204	1.41
Unskilled	160	190	1.19	102	112	1.10
Farmers	160	148	0.93	102	94	0.93

Fig. 5.2

Source: Economic survey Federal Office of Statistics Ikoyi, Lagos. Adapted from, Olatunbosun, D. "Nigerian's neglected Rural majority"(1975).

The contention here is that:-

(a) Agriculture will continue to be the cornerstone of the economy when the oil wealth drys up.

(b) Agriculture will continue to provide the bulk of the nation's employment for a long time to come.

(c) With the population rate growing at about 3% annually, urbanisation and real income projection will have to rise sharply and the demands for more and better staple food is expected to grow 5-7% annually.

(d) Agriculture will also have to meet most of the country's raw material requirements for local industries and export which will continue to be an important earner of foreign exchange (Fed. Ministry of Econs. Dev. 1975).

With her great wealth of agricultural potentials, in human, minerals and other natural resources, Nigeria has a vast area of arable land of 40% out of

a total land area of 92 million hectres, a varied climate and vegetational characteristics which gives her the potential of growing almost all tropical crops. This situation of great promise for the future led to the following steps being taken at the present:-

AGRICULTURAL POLICIES

The Third National Development Plan (1975-1980) spealt out the government's new agricultural policies some of which are reproduced below:-

"Two stratergies of investment have been contemplated namely,

(a) assistance to private farmers,

(b) direct government investment in the farming industry in large scale plantation, land development and irrigation schemes. That assistance to private farmers will take the form of:

(i) Supply of inputs such as fertilisers at highly subsidised rates.

(ii) Provision of credits.

(iii) Monetary incentives (commodity price stabilisation).

(iv) Provision of support services (extension personnels)" (Nigeria Yearbook, 1976).

This elaborate effort notwithstanding, it is obvious that in the absence of trained personnel at all levels of agricultural manpower needs of the country, and at middle level cadre in particular, the situation will continue to improve only at a snailpace. This stand is supported by every individual who has been involved either in planning or management of complex social change as the statement below proves:

> "Planned social change in a developing country is a complex and difficult process involving both human and natural resources. To achieve this, immediate and long-range objectives must be established in conjunction with the most effective educational method to produce exceptionally well trained and skilled professional personnel who must engineer the process of change".

(Williams S. K. T. 1967)

Robert C. Clark (1966) noted also that many of the important and complex tasks associated with agricultural development which must be performed are tasks for professionals "requiring the skills and knowledge of very capable agricultural extention officers". These statements prove that agricultural extention education is a key accelerator to effective agricultural development anywhere in the world and for a developing country like Nigeria in particular, logically therefore we would like to know what the state of education has been in Nigeria since the pre-colonial days, to the period of independence and after. We would want to see the state of vocational training in general and training for field level agricultural extension work in Nigeria and the Northern States in particular.

5.3 HISTORY OF EDUCATION IN NIGERIA

The Christian Missions were the pioneers of Western education in Nigeria. Several Missionary organisations had actually brought western Education to Nigeria decades before the British Colonial government effectively occupied Nigeria. By the 1940s formal schools had started in the South by different Missionary organisations.

The Northern parts of Nigeria experienced exposure to Western education later due to the strong influence of Islamic religion and to some extent geographical difficulties. The missionaries set up schools mainly to aid the spread of their religion through smoother communication. This fact is supported by what W. Boyd said in the following words:

> "It must be kept in mind that the church undertook the business of education not because it regarded it as good in itself but she found that she could not perform it's own proper work

without giving it's adherents and especially it's clergy, as much of the formal learning as was required for the study of the sacred writings and for the performance of their religious duties".

The spread of Western education was thus slow in the Northern part of Nigeria because Islamic scholars were busy spreading their form of education at the same time. On the other hand the indirect rule policy of the colonial administration and the non-interference of Western missionaries in this area all contributed to the slow pace of Western educational development too. Lord Lugard in 1901 reaffirmed this state of affairs in these words: "Government will in no way interfere with the Mohammedan religion. All men are free to worship God as they please". As a result of this attitude, the first formal school was openned only in 1909 in Nassarawa, Kano.

Western education was mainly left in the hands of the missionaries with very little participation

by the Colonial Government probably because it had neither the human nor the financial resources especially during the first world war. All the government's aid to the missionaries were in terms of grants-in-aid which was usually small especially in the North. It was only in 1925 that the Colonial Government issued its first policy in education. The educational policy for Nigeria at that time could be summed up in the following words: "A complete educational system which should include primary education, secondary education of different types, technical and vocational schools and institutions some of which may hereafter reach University rank for such subjects as teachers' education, medicine and agriculture.....". It was from this point that dynamic colonial administrators like E. A. S. Hussy who was then director for education reviewed the entire educational system and made proposals for reform in line with the government policy with three levels of education namely:

(1) Primary

(2) Intermediate

(3) Vocational higher education,

which later led to the establishment of the former Yaba College.

The pace of activities were slowed in the 1930s due to the great depression of that decade which also affected the educational programs of the Colonial Government. One step taken to upset the impact of the depression on education in Nigeria was to reduce the strength of expatriate staff of the colonial government and train Nigerians in various vocations to take their places. Various departmental training schools were set up as a result and they include the following:

(1) The Nigerian Railway training School (1906) which train selected staff and later between 1930 and 1940 was expanded to train African engine drivers and maintenance men. The course duration started from six months in 1901, to nine months in 1930-1940 and finally

was extended to cover up to one year.

(2) Government Survey School (1905), this was attached to the survey department Lagos and later moved to Ibadan (1926) and to Oyo (1934). It was a four year course comprising two years of practical and two years of theory.

(3) The Department of Agriculture set up three types of courses ,

(a) a School of Agriculture in Ibadan and Samaru in the North. "Agricultural Schools designed to provide a training in agriculture and agricultural sciences for candidates for appointments as assistance in the department of agriculture and in the native administration, existing at Ibadan (1921), in the North (1932)..... whose objective is to combine the necessary, theoretical instruction with practical training designed to give the pupils a through insight into the systems of

agriculture which have been found to be suited to the two areas".

(b) Forrestry School at Samaru which was a year course and later transfered to Lagos.

(c) Veterinary School at Vom (1935) to train veterinary assistant officers.

These and many other intermediate level courses were set up to train and fill the vacancies created due to shortage of European staff and admissions to these courses were controlled to ensure that not too many were trained for a limited number of positions. The 1946 constitution which divided Nigeria into three regions was a major landmark in her educational development due to the fact that regional educational policies and programs started to develop independent of each other in these regions.

This brief review shows how training in general and vocational training in particular began in Nigeria and we could notice the slow pace of take-off

in the Northern part of the country. We will now turn our attention to the history of Agricultural education in Nigeria with particular attention to the Northern States or what was then known as the Northern Region.

5.4a AGRICULTURAL EDUCATION IN NIGERIA

Agricultural education in any part of the world is an intimate part of the overall educational system, as a result it's pace of development is linked with the general educational progress of such an area. Research and field extension are directly dependent on education for their existence and effectiveness. This fact is supported by Wilson F. B. (1967) when he said that: ".....technical education and training in food and agriculture are universally recognised as key factors in the whole proccess of economic and social development in African countries. Agricultural education at all levels from University Faculties

through intermediate levels to farmer training has developed rapidly in the past ten years". This development reflects a new attitude by the government to the fundamental importance of developing the agricultural and human resources of their rural areas as the most important single factor of social and economic progress and prosperity.

In most African countries, agricultural education is divided into three levels namely;

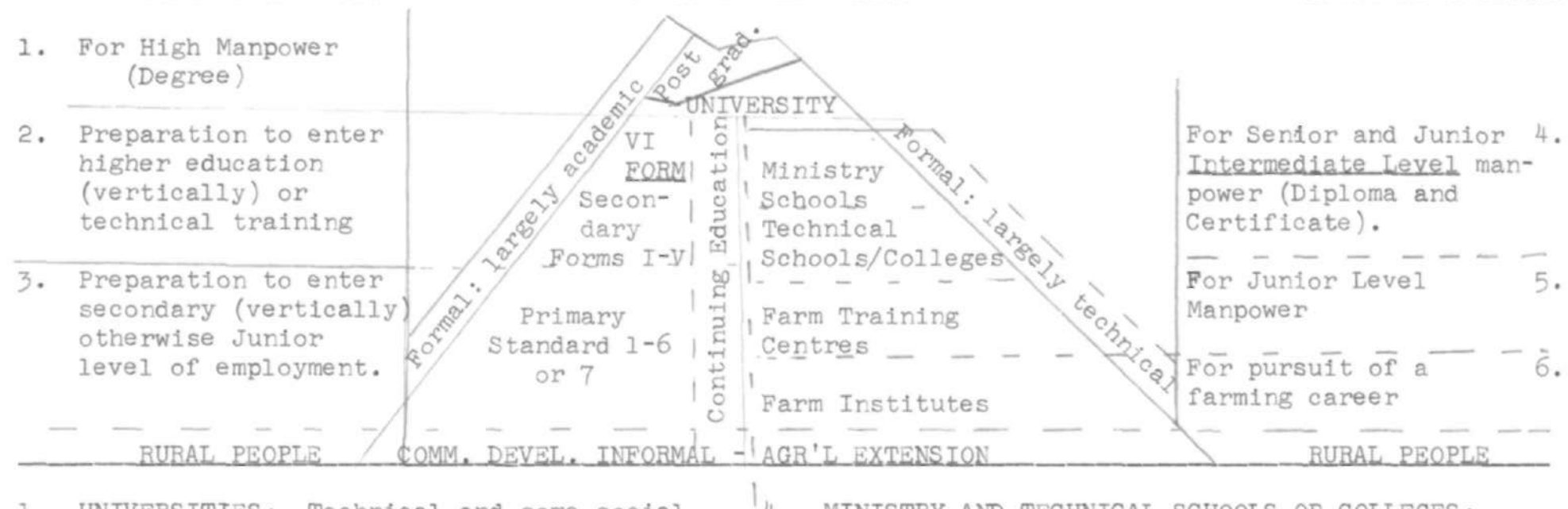
(a) Higher education (degree)

(b) Intermediate level (diploma and certificate)

(c) Farmer training and other forms of vocational systems.

J. M. Kincaid has given a pyramid of educational training institutions for general and technical agriculture in Nigeria as shown in (fig. 5.3) below. In Nigeria these three levels are designed to fill certain staff positions in the Ministries of Agriculture and Natural Resources, firms and other quasi-government organisations.

(Fig. 5.3) PYRAMID OF EDUCATIONAL AND TRAINING INSTITUTIONS FOR GENERAL AND TECHNICAL AGRICULTURE IN NIGERIA



1. UNIVERSITIES: Technical and some social science education in faculties of Agriculture, Veterinary and Forestry.

2. SECONDARY: Academic education with some "Agricultural Science" subjects

3. PRIMARY: Academic education with some "Rural Science" studies.

4. MINISTRY AND TECHNICAL SCHOOLS OR COLLEGES: Technical training in Agriculture, Animal Health & Husbandry, Forestry, Irrigation Home Economics, Laboratory Technology, etc.

5. FARM TRAINING CENTRES (NORTH): Practical agricultural training for Junior MOA staff.

6. FARM INSTITUTES: Practical training in farming for young adults.

Source: Adapted from J. M. Kincaid.

HIGHER AGRICULTURAL EDUCATION

Four of the thirteen universities in Nigeria at present have faculties of agriculture and most of the universities are modeled after the pattern of British Universities and hence offer B.Sc. general or honours.

The F.A.O. World Conference on agricultural education and training reports (1970) in Denmark highlighted the fact that "the amount of practical field work within the curriculum required in a degree course remains highly debatable" in developing countries. However, the conference recognised the need for a viable relationship between higher agricultural education, research and extension as a realistic and practical approach both to the planning and development in agriculture.

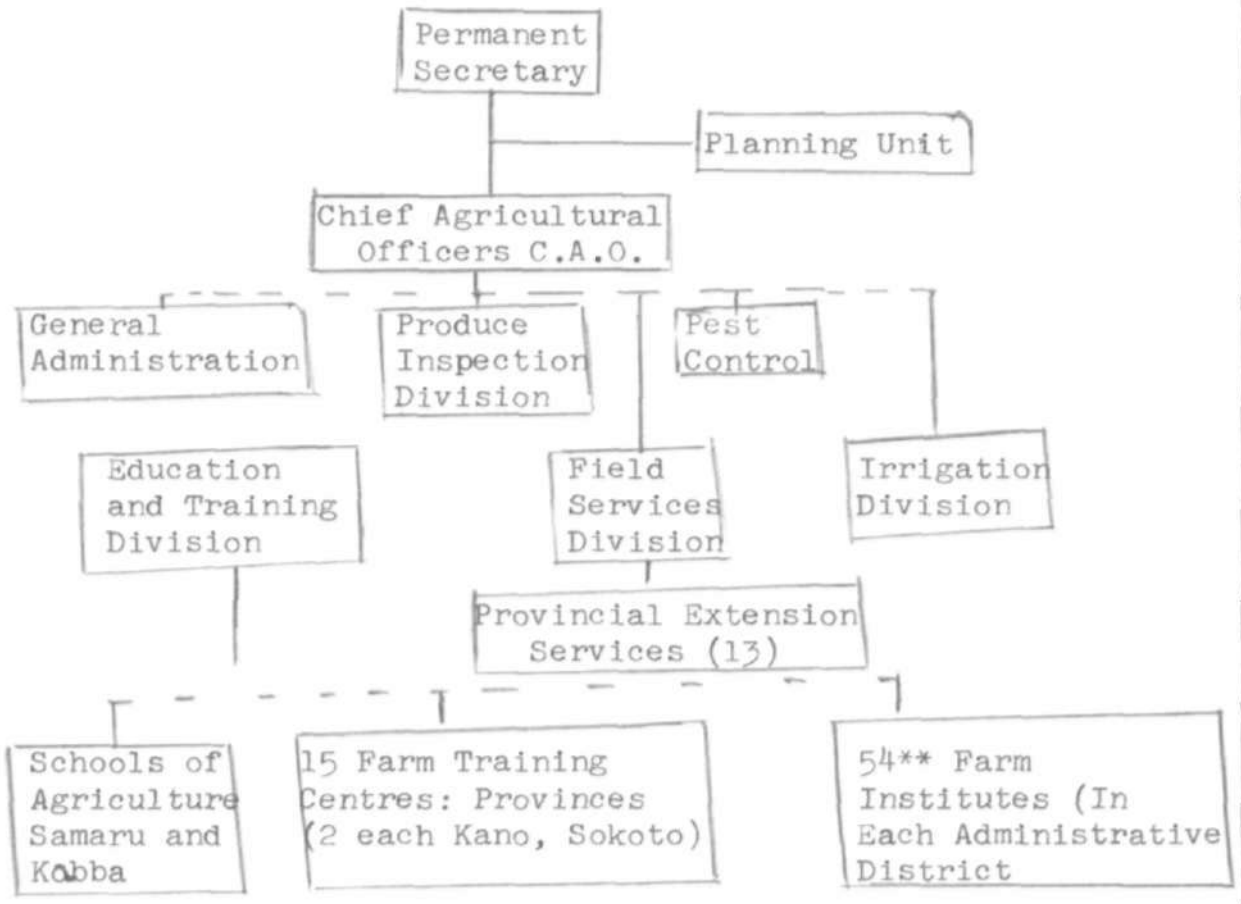
5.4b INTERMEDIATE AGRICULTURAL EDUCATION

The world conference on agricultural education and training has outlined the aim of intermediate

education and training which is to "produce agricultural technicians who are capable of breaching the gap between university graduates and the farmers" but went on to say that in "most developing countries in Africa, intermediate level agricultural education is the least developed, although it is the one which countries can best afford".

Intermediate level agricultural education is divided into a low and higher level (certificate and diploma). In Nigeria these schools are run either as part of the agricultural complex of a university or by the Federal or State Government Ministries of Agriculture and Natural Resources. The organisational structure of most ministries of agriculture in the Northern States is shown in (fig. 5.4) below. It is encouraging to note the increase in the number of technical and vocational agricultural schools since independence and especially in the 1970s. Each of the Northern States

ORGANISATIONAL CHART FOR NORTHER MINISTRY OF AGRICULTURE



(Fig. 5.4)
Source: Ministry of Agriculture Benue State.

** Represents the planned number of Institutes.

There were 26 in operation 1965 - 66.

now has an agricultural school and it is this prolifriation that induced the approach taken in this study (system analysis of training) The development of schools and origins are shown in (Fig. 5.5) below.

SCHOOLS OF AGRICULTURE IN THE NORTHERN STATES

OF NIGERIA AND YEARS OF ESTABLISHMENT

Schools	States	Year of Establishment
College of Agric. Samaru	Ahamdu Bello University	1931
College of Agric. Kaduna	" " "	1960
College of Agric. Kabba	" " "	1964
School of Agric. Bauchi	Bauchi State	1970
Colllge of Agric. Bakura	Ahmadu Bello University	1973
School of Agric. Yandev	Benue State	1973
School of Agric. Zuru	Sokoto State	1976
School of Agric. Lafia	Plateau State	1976
School of Agric. Zonkwa	Kaduna State	1976
School of Agric. Mokwa	Niger State	1976
School of Agric. Maiduguri	Borno State	1977
School of Agric. Tomas	Kano State	1978
School of Agric. Jalingo	Gongola State	1979

Fig. 5.5

Source: Ahmadu Bello University Library (1980)

Any analysis of Nigerian agricultural education which fails to make mention of farmer's training centres would be incomplete. These are permanent centres where farmers are trained Rowat R. (1965) has classified agricultural training in Nigeria into two broad types:-

(a) "Those which set out to train existing or established farmers, and therefore usually older men, in improved farming, proccessing and managerment techniques; At these levels the courses are usually very short, with a maximum of two to three weeks duration, and deal with only one topic at a time.

(b) Those designed to train potential farmers who may or may not be the sons of existing farmers, but are usually young men from rural areas. Here the training is comprehensive covering at least one full circle of training operation, and frequently including some general education also".

In the Northern States the farm institutes and training certres are of the second type. Farm institutes are established demonstration centres where young men are trained in practical agriculture so that they return to their home community and villages and these become instruments in introducing improved practices to the local farming system.

The Farmers' training centres offer practical training to young farmers with some general education for the jonior level manpower requirement of the ministries of agriculture or local government agricultural services and these are designated as agricultural instructors.

Having related the history of agricultural education in Nigeria and the state of extension education in the Northern States, we will now turn our attention to how the training needs of potential agricultural extension workers in this

part of the country could be determined so as to maximise the use of scarce resources of men and captital.

It was earlier pointed out that every system has a goal and that the ultimate justification of survival of any system is the degree to which it meets it's goals. The most serious problem facing the agricultural extension system in the Northern States of Nigeria is shortages of skilled personnel. "Onazi O. C. (1974-75) noted that because of the difficulties and complex tasks" involved in agricultural development programmes it is not practicable "for any one to attempt organised educational programmes at any given time for all extension related problems affecting the farmer and his farms". He further suggested in view of this that it is "very important to carry out a careful analysis of the relative needs for extension training in various problem areas". So as to maximise resource, use and the

total accomplishment of extension and it's effectiveness, he concluded that the establishment of such needs and "listing of priorities" will then make for "better utilization and more productive use of available scarce resources".

Staley (1971) viewing the problem in the same light said that "to neglect systamatic analysis of needs may result in expensively wasteful effort to produce the wrong kinds of skills while really urgent requirements for other types of skills that are so scarce as to constitute bottlenecks in the country's development go unattended". In this connection Legan (1964) has noted that "effective training programmes are developed by identifying individual and group needs and interests and arranging actions that meet them". It is therefore incumbent on designers of extension training programmes to undertake critical analysis of training needs, evaluation of methods, techniques, etc. so as to ensure that the training provided accomplishes the

desired objectives which include among other things the right skills and attitudes. The steps and methods involved in need determination for a training system was discussed earlier.

Research work on learning needs of agricultural extension system in Nigeria is not easy to come by, in fact it is almost non-existant. Williams S. K. T. (1967) identified eleven subject areas for extension workers' training needs in the following order of importance.

(1) programme planning procedure

(2) staff relationship within agency and with outside agencies.

(3) teaching/learning situation

(4) knowledge of technical subject matter in agriculture.....

he regarded this last part as the most important and the primary basis for extension effectiveness. Quite a number of areas have been identified as crucial for extension training by various Authors but the outline provided by Onazi (1973) seem

to be quite embracing and they include the following:

"(1) agricultural extension phylosophy, organisation and administration

(2) sociological factors

(3) educational proccess and human development

(4) programme planning

(5) communication

(6) research and evaluation

(7) technical knowledge in agriculture".

The importance of need determination in extension training can best be realized when we notice the volumes of research time and effort that have been spent on this area of agricultural system analysis in America and Canada by such scholars as: Mount (1949), Mathews (1950), Cook (1957) and McCormick (1959) as reported by Onazi O. C. (1974). In the Northern States of Nigeria as might have been obvious already no serious efforts have been made to systematically analyse the agricultural training system. Training institutions have been set up with little or no

regard for environmental, individual or/and organisational needs. The steps outlined in this work (chapters 2 - 4) is an attempt in this direction.

5.5 SUMMARY AND CONCLUSION

We have succeeded so far in this work to outline the necessary steps in the application of system concepts to the field of training in general and agricultural extension training in particular. It is obvious from our argument that trainings generally involves the synthesis of complex and inter-related disciplines. These relationships can be factors fostering or thwarting the achievement of training objectives. To successfully circumvent any constraints that accrue in training especially in professional trainings like agricultural extension, synthesis of factors becomes indispensable. These factors include among other things; (1) greater understanding of the socio-economic aspects of the rural societies where the trainees will eventually work. This will enable

trainees while undergoing the course to appraise and appreciate the rural societies and their peoples. (2) it will bring rural societies closer to training institutions and research centres so that programmes could be planned that meet the needs of the rural societies as "Coombs (1974) rightly said;

> agricultural schools and colleges, research institutions, information centres, extension services and training centres constitute what is tantamount to a knowledge/generation and delivery system.....".

It is suggested that since the institutions have the primary objectice of training agricultural field extensionists for various parts of the Northern States, the unique needs of each State should be a dominating factor in curricullum development that best suit each area. The practice of adapting syllabuses from older institutions indiscriminately should be discouraged. (3) The evaluation of extensionists' performance should be a regular feature

of the activities of ministries of agriculture and other agricultural institutions involved in the diffussion of agricultural inovation to rural societies.

The system models outlined in this work and the evaluation procedures discoursed, if followed will produce, it is believed, an efficient training programme for extension workers in the Northern States.

of the activities of ministries of agriculture and other agricultural institutions involved in the diffussion of agricultural inovation to rural societies.

The system models outlined in this work and the evaluation procedures discoursed, if followed will produce, it is believed, an efficient training programme for extension workers in the Northern States.