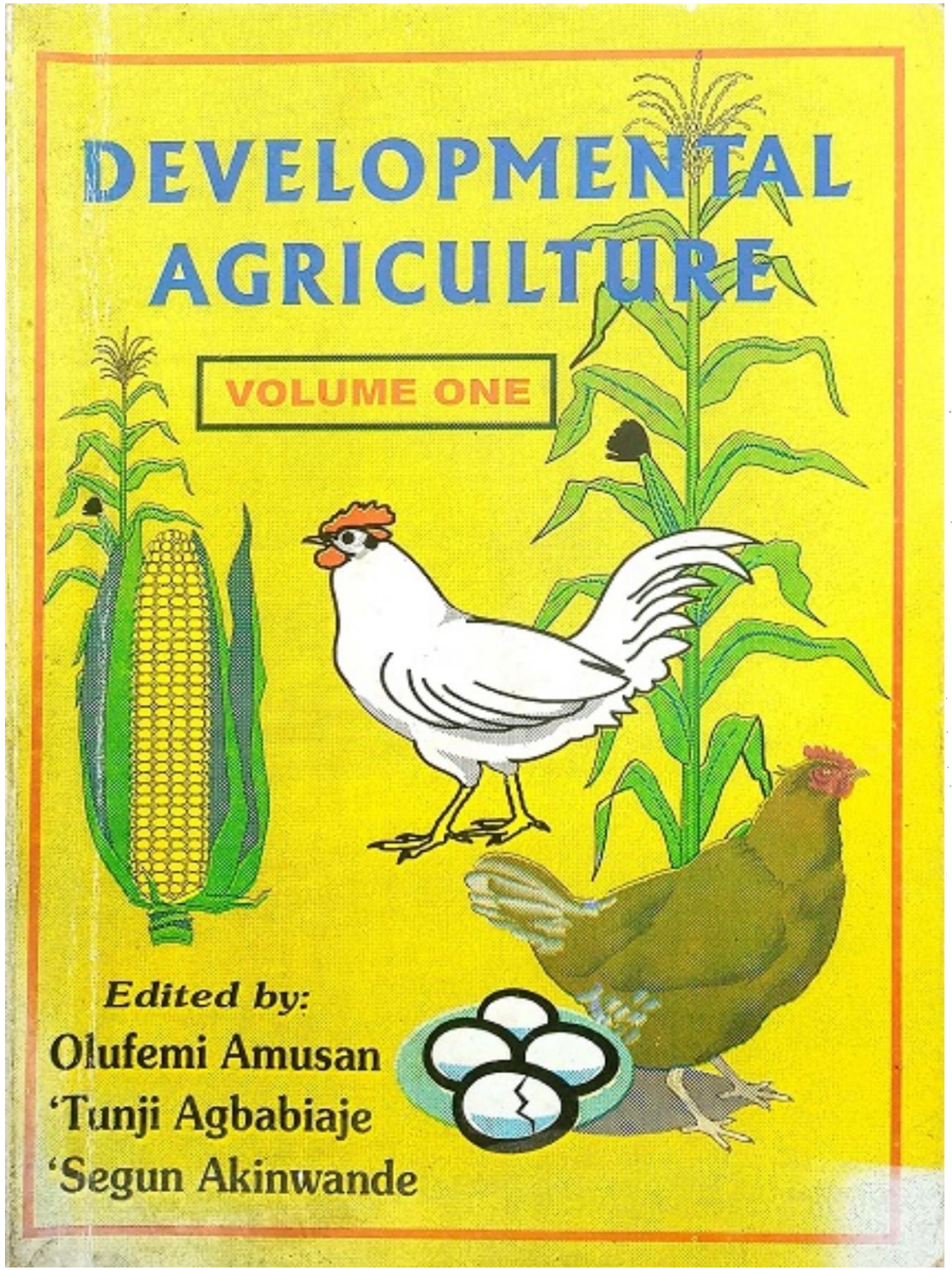

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10

TEACHING AGRICULTURAL SCIENCE IN SCHOOLS

By

E. A. ALADEMERIN

- Introduction
- Broad Fields of Agriculture
- Objectives of Agricultural Education
- Teaching and Learning Strategies in Agriculture
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INTRODUCTION TO THE CONCEPT AND MEANING OF AGRICULTURE AND AGRICULTURAL SCIENCE

Agriculture is a life supporting engine for the sustenance of the living beings especially higher and lower animals and has daily relevance to man's activities. It is a naturally endowed discipline with very rich heritage of the life and serves every man in a way comparable to how the heart services the human body.

In a broad sense, agriculture can be defined as the production, conservation, regulation of the basic raw material used for food from plants and animals and then the availability of shelter and comfort that are best available for the consumers' uses.

Agricultural Science on the other hand can be defined as an integrated subject in which all areas of science-Physics, Chemistry, Biology, Mathematics, Geography, Genetics, Physiology, statistics etc. are well combined and applied with systematic production of crops and animals resources in addition to intelligent uses of soil and natural resources for Man's Uses.

Local crafts/Domestic Science, agriculture and Agricultural science are being offered in all Nigerian formal schools at the primary, junior Secondary and Senior secondary levels respectively. The method of instruction and guidance activities involved in the teaching of the subject at all levels of formal education enables the learner to relate and associate with the discipline in totality. The schools system in the country in implementing the concept ofd these subject still offer them more academically rather than vocationally oriented. A meaningful and functional agricultural education at all levels of our educational system prepares persons to be directly and indirectly involved in the acquisition of farming skills, knowledge, abilities, understanding and interest for maximum production in plants and animal resources.

It is important to note however that there is the need to overcome the strong tendency to use an academically oriented approach rather than a vocationally oriented approach to curriculum development and teaching in all formal institutions offering agriculture in the country. Appropriate curricula must be developed, validated, installed and used realistically if students are to be informed and prepared for the world of work. Children need to have an educational programme which integrates learning by doing. They need a programme which merges their worlds of the school and the home with those of the community and the workplace into a challenging and productive unit.

Our primary roles as Agricultural science teachers is to open the door and let the students search and explore the different opportunities that await them beyond the secondary School. The decision should make us to train him or direct him towards the right steps of achieving his objectives in agriculture.

BROAD FIELDS OF AGRICULTURE

As earlier explained, agriculture concerns all aspects of human endeavors and it is closely interwoven with the social aspects of rural life of Man. The several training aspects of agriculture are indicated below:

1. **Avocational Agriculture:-** this enables one to enjoy all the basic trainings involved in all aspects of agriculture but not for the purpose of any form of vocation or paid exercise.

2. **Citizenship Agricultural Education:-** this enables one to take a course or training in agriculture and related fields just for the purpose of being a good citizen in the society and this may be taught as part of the schools citizenship training programme e.g farming scheme of the NYSC programme. It is a formal training in agriculture which makes one to be efficient and good in the society which he belongs.

3. **Agricultural Practical Arts:-** this is an integral part of the schools' practical subject which a person is supposed to know so as to be able to successfully perform the psychomotor and manipulative skills involved in theory- clearing, tilling, planting, weeding, fertilizer application, harvesting, processing, marketing etc. of farm products.

4. **Agricultural Consumer Education:-** this relates to what one needs to know about distributive trade in agriculture in order to be an intelligent consumer/distributor of varied farm products and it involves everyday training.

5. **Agriculture for Value and Therapy:-** The manipulation of body motor and skills is a form of physical exercise which enables the body to be healthy and active (physical therapy). The gladness and joy that one gets watching his crops and animals grow on occasional visits tom the farm refers to the Mental Therapy, The value refers to the revenue from sales.

6. **Vocational Agriculture:-** "This is the sum total of overall curriculum planning and its effective implementation in agriculture (in whatever form) in all facets of our educational system from the pre-primary up to the tertiary level leading to productive ventures in plants and animal resources of benefits to mankind in addition to intelligent uses of soils" (Alademerin, 1996). According to Esuruoso (1996), "Vocational agricultural education is a sphere of training of body and mind that should make

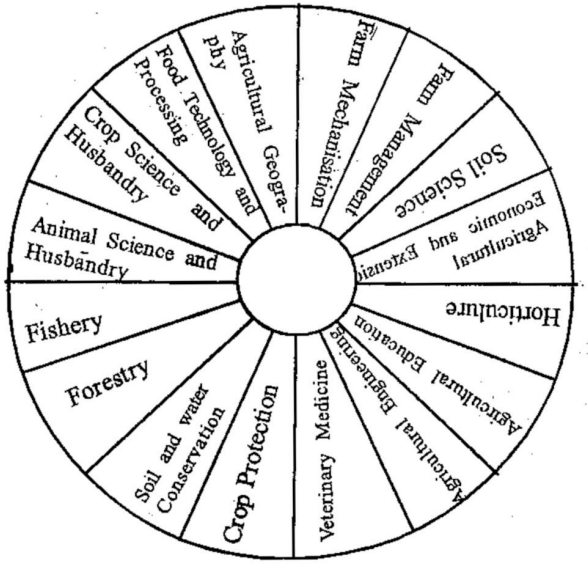
the man and woman fit for a life long vocation and a positive way of thinking and living- inspite and in view of the factors, events, forces and circumstances around him or her".
This type of agriculture is further divided into off farm and on farm occupations.

(a) **Off Farm:** Not based on the farm but has relevance to storage, sales and a supply of agricultural products from farms and like fertilizers, chemicals, insecticides, pesticides, heavy farm machinery, processing materials and equipment etc. they form the bulk of farm inputs.

(b) **On Farm:** based on the farm and usually for practicing farmers and requires basic and advanced knowledge and skills in farming.

Vocational agriculture can be graphically represented in this form:-

THE SCOPE OF AGRICULTURE



OBJECTIVES OF AGRICULTURAL EDUCATION

According to Phipps (1959), "Agricultural education and related development include the whole gamut of teaching, intensive and aggressive research work into (a) the crop and livestock husbandry and production including traditional and others; (b) protection, Management and expansion of forests; (c) control of pests and diseases of Man and his animals and his plants; (d) conservation and gainful use of soil and water (e) Provision of Means of communication appropriate to the need; (f) Extension of Social Services to rural communities (g) Modification of traditional attitudes towards the land where such militate against the satisfactory use thereof; (h) Organisation and economy of subsistence and other production (i) total education for able bodied men to engage in disseminating research findings to the rural areas, for researchers who engage in various findings to improve upon plant and animal characteristics".

The growth, development and future of any nation depends upon the intelligent use and conservation of its natural resources and "by advancing our knowledge of resources and employing them accordingly, we can progress and prosper through ages to come" (Parson, 1965).

Our knowledge must be constantly broadened in agricultural education so that it leads to discovery, invention and adaptation to alter the prospect and shift the point of focus to greater development. It must keep pace with scientific, industrial and commercial progress. By scientific progress, agricultural education through intensive research, has been able to produce qualified and able breeders that specialise in animal and crop sciences. Agricultural education has also combined this with the industrial progress in improving upon the crude approach to farming with the use of machinery tractors, plough, harrower, redger, harvester, slasher, sprayer etc. Also, agricultural education has also combined the scientific progress and industrial progress into the final stage of production which is the commercial aspect. This has to do with sales, modern preservation methods of perishable products through the development of cold stores, refrigerators, dryers, silos, barns etc.

The main objectives of agricultural education to the Nigerian child are a follows:-

(i) To assist Nigerian citizens to develop the attitudes, understandings and abilities regarding agriculture and related fields necessary for future welfare of all and sundry.

(ii) To develop appreciation of Nigeria's rural heritage and its influence on literature, drama and music.

(iii) To develop the understanding of the influence of agricultural research on farming and other aspects of our society e.g. Medicine, Statistics and Consumer products,

(iv) To develop understanding of the interrelationships of agriculture and other segments of society.

(v) To develop the understanding of the influence of the public policy on agriculture.

(vi) To develop understanding and appreciation for a vocational and leisure interests.

(vii) To assist and make meaningful for the students involvement in the special educational programme for the school and to promote creative activities of students.

(viii) To promote meaning and practical applications of the content of the other subject matter areas such as the sciences.

(ix) To provide guidelines regarding the occupational activities of on-farm and off-farm ventures requiring skills and knowledge.

(x) To assist in improving the economic efficiency of agriculture and individuals in agriculture and also to develop understanding of the contributions of agriculture to the society.

(xi) To promote balance and meaning in the total education programme of the school and of the individuals.

(xii) To assist present and prospective farmers to improve their efficiency in farming and non-farm agricultural jobs.

Teaching and Learning Strategies in Agriculture

Teaching and learning in agriculture is a two-way communication system between the sender who is the teacher or the instructor as the case may be and the receiver who is the learner or student. For the communication system to be efficient and fruitful, some strategies are usually employed from time to time. These are: Teaching methods, teaching techniques and use of Instructional materials otherwise called Realia.

(a) Teaching Methods

The teaching of agriculture at all levels of our formal education must be such that will arouse inquiry and students interest. It must not be taught in abstractions because of its relevance to our daily lives. A variety of methods may be employed to make teaching more effective viz:-

(i) **Verbal Instruction:-** This is used at all levels of formal and informal education. It is very common and it involves the systematic presentation of concepts or information or instructions orally by the instructor and may occasionally involve the use of appropriate instructional materials on the topic taught. This method is mostly used by agricultural Science teachers who do not have easy access to instructional materials and probably do not have good grasp and mastery of what is being taught. It is essential and important that the information or explanations that instructors or teachers have to give should be quite clear, expressed in language which their pupils can readily understand and presented in an interesting and systematic way. Time of lesson and age of pupils are essential considerations in the use of this method.

(ii) **Lecture Method:** This is an advanced method of oral instruction in the classroom. A greater percentage of the period for the lesson is occupied by the teacher who does the talking and the students, the listening and occasional notes taking. It is therefore suitable mainly for mature students and adults especially in Colleges and Universities. This

method involves a lot of prior planning and it ensures maximum amount of information to be given out in a limited time to unlimited number of students. The shortcomings of this method are the passivity of the students, minimal feedback, reliance on the hearing sense and the limited retention of knowledge given in this way.

(iii) **Discussion Method:-** This requires exchange of opinions, facts, ideas and points about a topic in a class. The teacher and the students all contribute to the lesson and everyone now draws upon the experience and knowledge of the group instead of leaving their reliance solely on the teacher. The teacher acts as the leader and directs the lesson.
In starting a discussion lesson, the following could be followed:

(a) Announce the topic for discussion to the pupils.
(b) Allow each person to express his ideas on the subject.
(c) Ask challenging questions as the discussion continues and call on individuals to respond.
(d) As pupils respond, draw in other by allowing them to express their opinions.
(e) Significant facts should be recorded on the chalkboard, as they are brought out by the pupils, to help guide the discussion and allow the pupils to see the relationship between facts and ideas from the discussion.

An enhanced method of discussion is the brain-storming method which involves Co-operative thinking by groups of individuals in solving a specific problem. It leads to stimulation and generation of ideas and facts and facilities expression of pupils. It is only good for every mature students and adults.

(iv) **Demonstration Method:-** The learner maximally uses the sight and a little hearing to concretise the concepts taught. This method may involve:-

Class demonstration: The teacher stands before the students and demonstrates an act e.g. the use of any farm implement or the use of a hand trowel etc. It saves time.

Group demonstration:- the class is divided into groups and then observes the demonstration one after each other.

Individual demonstration: this is usually done to individuals in a class to take care of the individual differences and to ensure that an activity is well understood and performed by all.
This method may be result, laboratory or example demonstration

(v) **Problem Solving:-** This is like a brain storming session on the part of the individual learner. The learner faces a lot of difficulties and

obstacles in reaching to a solution of a problem. Suitable problems which are within the capacity of students to solve are given and this develops reflective thinking, creative expression, critical analysis, and logical reasoning in the pupils, and provides valuable carry-over benefits of application to future individual and group problems. This method will be most useful in Agricultural mathematics and related numeral areas.

(vi) **Project Method:-** The student undertakes the work under the adequate supervision of the teacher who scrutinizes every step and action in a logical sequence to the end. The main job of the teacher is to merely guide and co-ordinate the work while the students do the rest. Project method improves inquiry and enables the learner to probe, furthermore into new areas. It could be in any area of crop, animal, soil, science etc. This method is only practised in tertiary institutions to make graduating students research minded. The interest and enthusiasm aroused can help children to learn other things more quickly and firmly in their more formal lessons.

(vii) **Role Playing:-** Otherwise called the drama method as it involves some acts as if they are involved in a real-life situation or incident. It gives pupils better understanding of the behavior and emotions of various different kinds of people in the real life. This method may include drama on sale of agricultural products, activities on the farm etc. This method is very effective among younger pupils in a primary school, who are always interested in taking active roles in a play and usually do it quite spontaneously.

(viii) **Field Trips:-** Otherwise called visits and excursions. This is a form of planned visit to places of interests that have relevance to agriculture. It enables students to get a first hand information about all what has been previously learnt under a formal classroom environment. It enables learners to concretise concepts and visualise them in their real life situations e.g. watching farm machinery work, watching dairy cows being milked, cropping of fishes, mating of from animals etc. This involves three parts:

(a) Discussion period for planning the trip.
(b) The trip itself.
(c) Class discussion after the trip to evaluate what were seen and learnt.

It can be used to help to make the relationship between the school and community programmes closer.

(B) TEACHING TECHNIQUES

In addition to methods, some techniques are employed in teaching agricultural science to help the pupils achieve their educational objectives.

These are:

(i) **Questioning:** This is the most common teaching technique which is a series of words in a sentence said by a questioner to a listener or a group of people which is well understood and requires an intelligent response. It is an efficient form of evaluating the level of understanding of a lesson. Questions can stimulate different types of thinking in students thus:-

(a) Remembering
(b) Reasoning
(c) Evaluating or judging.
(d) Creativity.

Steps involved in questioning are:-

- ask the question; Is maize a cereal crop?
- pause ..... so that all think of an answer.
- call on one pupil by name to respond.
- listen to students' answer.
- emphasizes the correct answer.

(ii) **Learning through rapport:** this is a form of mutual talk by the teacher and the student over a problem situation in a relaxed non-threatening atmosphere. Giving confidence to the pupils and introducing some few jokes before the actual talk is an efficient way of helping students because the pupils sense of failure in relation to academic skills comes from repeated exposure to frustration and anxiety. Rapport is valued by all pupils especially on problems relating to practical works on the school farm.

(iii) **References:-** this is most useful for senior and mature students in tertiary institutions because it involve the use of libraries and other reading materials. Under this technique, students are to learn and seek information independently on their own. It provides challenging experience for more able students.

(iv) **Assignments:-** This is a form of evaluation technique and goes a long way in giving pupils the urge to learn more and get more facts. Works given are often with little guidance on how to solve or complete them. This is very suitable at all levels of formal education for proper learning of agricultural science.

(v) **Note Taking:-** This helps in proper organisation of more salient points and ideas. they should be brief and conscise to the points addressed. Too much notes in agricultural science should discouraged at lower classes.

(vi) **Action Research:-** this involves the teacher being a participant and the research may be geared towards his teaching method which he hopes to improve upon and also to solve some pupils problems.

(C) USING INSTRUCTIONAL MATERIALS

Instructional materials, teaching aids or realia a the case may be are very necessary treatise learning in formal classroom situation. The use of realia makes teaching to be more effective and promotes the application of basic principles of learning.

Realia are the sum total of all resource materials including real situations, direct experiences and activities used by teachers to relate instruction to real life. They are efficient teaching tools which if correctly used, enable the teacher to teach more effectively and the earner to learn more permanently.

According to Blanton (1980), "Realia serve many useful functions to make teaching more effective. First, realia enable the teacher to provide a variety of learning experiences for students thereby adding interest to the instructional programmes and thus increasing ineffectiveness. Second, they help speed up the learning process and make it more pleasant for the students. Third, they prevent the pooling of ignorance. Fourth, realia also help involve students in the participation in their own learning. In essence, realia arouse interest, provide the concept of physical characteristics, show details of construction, develop appreciation and understanding, span time and present related information".

Realia help in

(a) Stimulating greater student interest.
(b) More thorough understanding.
(c) Increased retention.
(d) Effective usage of time.

In Agriculture, the teacher that uses realia in a good communicator. Some realia may actually appeal to all five senses seeing, hearing, feeling, smelling and tasting. Learning is best achieved when there is interest and needs are being satisfied, thinking is stimulated, there is active participation, two or more senses are used, and a favourable climate of success is maintained.

A research funded by the Minnesata Mining and Manufacturing company points out that the ability of learners to retain information studied increased with greater participation and involvement association with the use of more senses. Learners retain 10% of what they read, 20% of what they hear, 30% of what they see, 50% of what they see and hear. 70% of what they say as they talk and 90% of what they say a they perform a task.

Another research indicated"1% of what we learn through taste, 11/2% through touch, 3 1/2% through smell, 11% through hearing and 83% through

sight": (Agusiobo, 1988).

In agriculture, realia are of four main types:-

(a) Audio aids
(b) Visual aids
(c) Audio Visuals
(d) Simulation devices.

A substantial part of our accumulated knowledge in agriculture has its roots in realia listed above. Audio include agricultural programmes on radio, record player, cassette recorder etc. Visual aid is any instrument or device that will stimulate learning through sense of vision e.g. slides, pictures objects or models.

Audio Visuals involves agricultural programmes on Television, Video tapes and films. Reading some concepts may not be adequate enough to actually get the real meaning. The sane goes with what is heard or learnt in a formal or informal situations e.g. some modern cultivation practices of cassava or varieties of maize. Students can be able to internalise more of the concepts either in crop production or animal or any other area of agriculture better as they see, do and perform that task individually e.g. milking a dairy cow, fertilizer application on a maize farm, candling of eggs etc. When realia are effectively used in agriculture, they offer a reality of experience which stimulates individual activity and motivates pupils to investigate or explore, thereby increasing voluntary reading in pupils. It also minimize the degree of abstractness of educational experiences and promote the retention of meaningful information. The technique of using realia does not take the place of oral communication, but it will go a long way towards clarifying the message a teacher wishes to convey to the students through the spoken word.

USING THE CONCEPT MAP IN AGRICULTURAL SCIENCE FOR CLASSROOM INSTRUCTION

Teaching and learning of agricultural science are deliberate acts with teaching directing the learning process or setting the pace. For classroom instruction to be effective, so many factors combine to make the whole exercise successful.

To make teaching and learning a hitch free exercise, some meaningful concepts otherwise called key words are used to drive the point further home for proper internalisation. A concept explains a single point of importance or substance in a statement and the concept map involves the relationship between all the concepts to form a logical idea or opinions about an issue of relevance on a particular topic e.g.

Animal - concept

Major Uses of farm animals - concept Map.

In other words, a concept Map is a skeletal framework containing the key points or words in a course, unit or topic which has relationship with one and another.

There are 3 types or levels of concept Map used for classroom instruction in agriculture:-

(a) **Primary Concepts:-** These are the major key points that in the base or foundation level e.g. poultry, piggery, cereals etc.

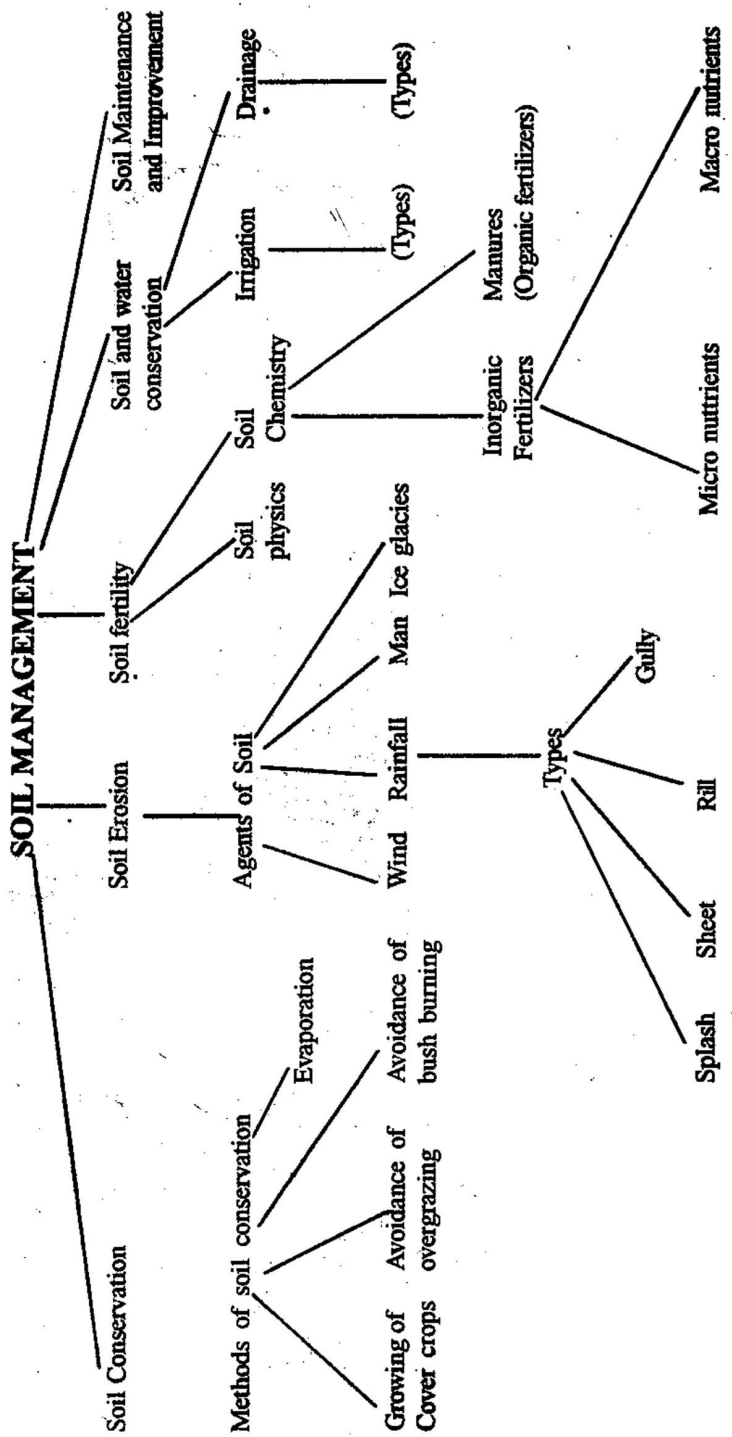
(b) **The Secondary Concepts:-** These are smaller than the primary concepts in scope but a bit complex e.g. poultry types, poultry management, types of cereals, breeds of pigs etc.

(c) **Tertiary Concepts:-** These are the smallest of the concepts and more numerous as they give the last information relating to the issues being discussed. In actual fact, they are the most complex of all and examples are - fowls, ducks, geese, free range, deep litter, rice, wheat, oat, American duroc, British large white, West African dwarf etc.

USES OF CONCEPT MAPS

Concept maps are used for the following in the effective teaching and learning of agricultural science in schools:-

(a) To plan a program of activity e.g. planning a project or curriculum on poultry, piggery etc.
(b) It provides important points to be taught in a lesson by the teacher
(c) It provide important points to be learnt in a lesson by the pupils in the class.
(d) It is used for evaluation purposes.
(e) It is an efficient method of testing and measurement of ideas.



Typical Lesson Plans and Notes

A typical lesson that is well planned bring specificity and concreteness to the activities performed in the classroom. It assists the classroom teacher in planning and organising instruction in ways that in the long run will save instructional time, avoid redundancy, and endure that critical learning needs are addressed.

It also makes teaching and learning easier and better thereby organising one's thinking about who, what and how to teach.

A poorly planned typical lesson wastes a lot of time and it is non-directional because they do not have clear objectives for the teacher or for their students.

Lesson plans as generally known are tools for tying societal and professional values to the learning needs in the classroom and to the school curriculum.

One of the chief purposes in presenting this material has been to tell and properly indicate how each activity should be done in order to accomplish the approved practices involved in proper classroom teaching and understanding of facts by students in certain aspects of Animal Science in Agricultural Science in Senior Secondary Two.

The criteria for planning every instructional situation differ. Lesson planning is a very vital element in teaching, since the whole decision making model is based on this skill. It is a process of deciding what and how the students should learn.

Cognitive learning theorist recognise that the amount and rate of learning is influenced by the nature of the subject matter itself, the way it is broken down and the order in which it is presented (Anderson and Ausubel 1965).

Ausubel (1965), Bruner (1960) agree that control over learning can be exercised most effectively in three ways:-

1. Substantively, by showing concern for the structure of a body of subject matter.
2. Pragmatically, by employing suitable principles of ordering the sequence if subject matter and constructing its internal logic and organisation.
3. Arranging appropriate practical skills/practice trials.

Lesson plan shows how a teacher organise his/her thinking about who, what and how to teach. The major concepts amount a typical lesson plan are aims, goals and objectives. They are often used interchangeably without the realisation that they have different but related meanings.

The content and form, or the "what" and "how" of a teaching, include choices of many different varieties. The choices are, infact so numerous that when left unnoticed, the resultant teaching is disconnected and incoherent.

Proper planning of a lesson structures give priority so that only the most effective teaching behaviours for attaining a given objective are employed, which provides the most instruction in the least amount of time.

It also ensures the process necessary for the execution of key behaviours of clarity, variety, task orientation and student engagement in the learning process at moderate -to- high rates of success. Without good planning, there is no assurance that these key behaviours for functioning as an effective teacher will be employed. According to Gary D.B. (1988).

The following four primary inputs are very necessary in planning a lesson:

1. Aims and goals, reflected by, for example, national and state policies and legislation, school district curriculum guides, and adopted text-books and materials.

2. Learner characteristics and individual differences, reflected by student aptitude and achievement; personality traits, including the student's anxiety level, motivation, and self-concept; home life and extent of disadvantagedness and

3. Knowledge of academic discipline and grade level curriculum, reflected by organisation of content, such as whole part relationships and sequences; ordering or priorities, such as connections and transitions among and between parts; major and minor themes, such as most important, least important; and content specific facts, rules, concepts, and abstractions.

4. Knowledge of teaching methods, reflected by key and catalytic behaviours, such as clarity, variety, task orientation, and student engagement in the learning process at moderate-to-high rate of success; considerations of pacing, mode of presentation, class arrangement, classroom management; and selection and use of textbooks, media and materials.

Secondary teachers do not write a typical lesson plan in a vacuum. They usually have a course syllabus which is laid down by the school or an extend body or preferably, the state ministry of Education. For the purpose of proper understanding.

I will now discuss extensively on a typical lesson plan in Animal Science section of Agricultural science in senior secondary 2 under the main course unit of Animal Nutrition.

The topic is:-

Sources of Nutrients for Farm Animals

Farm animals get all their basic needs from the green plants for maintenance of their body for daily metabolic processes like feeding, excretion, respiration, reproduction, energy exertion etc.

The nutrients got from the green plants are of various types carbohydrates, proteins, fats and oils, vitamins, minerals, water etc.

The nutrients serve various purposes in the body of farm animals and their sources differ so also their various functions in the animal body.

The main sources of all are the agricultural crops from all classes - tubers, cereals, legumes, pulps, peels etc.

Some of these basic body nutrients are also got from dead animal remains like shell, bones etc.

BACKGROUND INFORMATION

DATE: 15/4/94
NAME OF SCHOOL: IJEBU MUSLIM COLLEGE, IJEBU-ODE, OGUN STATE.
CLASS: SS2A
SUBJECT: AGRICULTURAL SCIENCE
COURSE UNIT: ANIMAL NUTRIENTS FOR FARM ANIMALS
PERIOD: 1ST
DURATION: 40 MINS.
AVERAGE AGE OF PUPILS: 15 - 18 YEARS
NO IN CLASS: 42

PREVIOUS KNOWLEDGE ON TOPIC: Students have been taught some topics on animal nutrition.

AIMS: To promote further understanding of the main course unit on animal nutrition in the students.

OBJECTIVES: At the end of lesson, the pupils should be able to:-

(i) State the various sources of nutrients for farm animals.
(ii) Identify the various sources from crops and others.
(iii) Explain the benefit of the sources to farm animals.
(iv) Describe livestock feeds that can supply the essential nutrients to farm animals.

Introduction	Content	Time	Instructional Materials	Teachers activities	Pupils activities
Topic - Types of Livestock ration	Performances ration	2 mins	Various poultry feed stuffs for - Growers - chicks - layers - broilers	1. Identifying common livestock feeds to the pupils. - Growers feeds - layers feeds - chicks feeds - Basal feeds - concentrates	1. Identification of common feeding stuffs like poultry feeds, basal feeds, concentrates etc.
Stage I	for daily metabolism - for maintenance - for healthy living	7 mins			
Stage II	Production ration - for eggs, meat - for milk, meat and hides - for skin, meat, blood, - for others	7 mins	Basal feeds Cassava/tuber peels, banana and plantain peels, grains, oyster shell, Groundnut cake, Palm kernel cake, Blood meal etc.	2. Describing the performance variables like - healthy frame of animals, good stamina and body structure in case of work animals and production variables like egg, meat, milk skin and hies etc.	2. Identification of the various feed components and sources of them in livestock feeds.
Stage III	Balanced ration - to contain all essential needs	7 mins		3. Explain the balance and weaning rations	

Introduction	Content	Time	Instructional Materials	Teachers activities	Pupils activities
Stage IV	Weaning ration - for lactating animals	7 mins			
Revision and Summary	A comprehensive list of various livestock rations and their components for livestock uses.	7 mins 5 mins			
Evaluation	How students can easily differentiate between allr ation types.				
Take home Assignment	(ii) What are their major sources (iii) What do the following suppply:- (a) corasses (b) peels of tubers (c) Rice bran (d) Oyster sheels				
Total		40mins			

THE SCHOOL FARM

The school farm is a land laboratory established by a college or school to provide appropriate learning experiences all aimed at achieving proper understanding of all that has been taught in theory in the classroom situation in clear practical terms. It enables students to observe, interpret and relate to those things that they have been taught. The college farm is designed to teach modern and scientific techniques necessary for large scale agricultural production.

The education values of the school farm includes:-

(a) To provide student with worthwhile experiences and skills in Agric business that they would not otherwise have.
(b) To demonstrate approved practices in agriculture.
(c) To conduct quasi-experiment on farms.
(d) To promote and co-ordinate supervised occupational experience programmes.
(e) To co-ordinate classroom theory and practice.
(f) To provide occupational experiences in working and co-operating with others.
(g) To provide opportunities for supervised occupational experiences programmes for persons preparing for a non-farm occupation requiring knowledge and skills in agriculture.
(h) To provide opportunities for supervised occupational experiences in courses in agriculture with non-vocational objectives.
(i) To publicise education in the agric business programmes in the school.

A school land laboratory should be regarded as an educational facility. It is important for school officials or other teachers of agriculture to have school land laboratory simply as a way to use land which is part of enlarged school campuses. The school officials or other should not use profit a their chief measure of success of school land laboratory, school land should be operated for educational purposes. Profits should be of minor importance. with the school farm, there is always the danger that the students will all be exploited to perform a certain type of work beyond the point where it has educational value. Student should not be exploited in the physician operation of the school farm. The school farm should be designed to give students experiences with simple farm technology and therefore should not be poorly managed.

ESTABLISHING A SCHOOL FARM

The following variables must be well considered before a school farm is established:-

(a) **Location and Topography** - The school farm must be ideally located

within the easy reach in the school compound. It must not be too far from the lecture hails, students hostel, office library etc. Other natural factors that must be present are a non-seasonal stream, good soil quality, a gentle gradient etc. All these are necessary to encourage all year production of crops and vegetables, reduction of the rate of run-off by erosion etc.

(b) **Size of the Farm:** -the main objective of the school farm is to serve as a land laboratory and for this purpose, the size must be of a manageable proportion to arouse educational interests. It must not be too large for the students to effectively manage.

(c) **What to keep:** The practical experiences on the farm should be diverse to cover a wide areas of agriculture as crops animals and biennials and tree crops etc. livestocks- monogastrics e.g pigs, fowls and poultry, Ruminants e.g. sheep, goats and cattle, fisheries, horticulture etc.

The crops to be planted may be legumes e.g. beans, melon and cereals e.g. maize. Guinea corn, millet etc. cultivated fruits e.g. Mango, Citrus, Cashew etc.

(d) Students Involvement -Students involvement on the farm must not exceed the officially allocated time on the time table. They must not be made to overstay on the farm to the detriment of other class lessons.

Areas of relevance for student activities on the crop farm are:-

- farm layout and planning.
- land preparation.
- preparation and selection of planting materials.
- sewing and planting of crops.
- herbicide and pesticide application.
- fertilizer application.
- weeding.
- harvesting
- processing and storage.

On livestocks farm:

- feeding of birds and animals.
- watering of farm animals.
- house cleaning/cleaning of pens.
- picking of eggs.
- disposal of animal wastes from pens.
- cleaning of dairy houses.

REVISION/TUTORIAL QUESTIONS

1. Define these terms and give specific examples to illustrate your points:
   (a) Agriculture
   (b) Agriculture Science
   (c) Agricultural Education
   (d) Vocational Agriculture.

2. Describe into detail the various training programmes in agriculture available to man in various endeavours.

3. Agricultural Science can not be easily divorced from the other areas of Sciences. Justify your stand with concrete examples.

4. What are the opportunities opened to a Nigerian child in Agricultural Education?

5. (a) How can the teaching strategies employed in Agricultural Science improve the understanding and learning of the subject?
   (b) Why are Realia often referred to as efficient teaching tools?

6. (a) What is a Concept Map?
   (b) Prepare a detailed concept map from any of these:-
   (i) Animal Nutrition (ii) Manures (iii) Farm Animals
   (iv) Classification of crops.

7. The school farm is a land laboratory available in schools to concretise learning. Justify your stand in support of or against this statement.

8. (a) What is a school farm?
   (b) What are the educational values derivable from the school farm?

9. (a) Why do you need to prepare your lesson in advance?
   (b) Prepare a lesson note in any stress area of agriculture and indicate the cogent variables.

10. Discuss exhaustively on four teaching methods and state their demerits.

SUGGESTIONS FOR FURTHER READING

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