AGRICULTURAL EXTENSION AND RURAL DEVELOPMENT DEPARTMENT
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THE TRAINING OF AGRICULTURAL DEMONSTRATORS AT BOTSWANA AGRICULTURAL COLLEGE
A Critical Analysis with Emphasis on the Curriculum Content

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In memory of my parents

My father

and

My mother

Sadly missed by us all

Dedicated to my husband, Henry Kintu for being both a perfect father and mother during my absence and providing me with love, support and understanding throughout my studies

To my children Vonile, Duke and Selemaye

To my brothers, sisters and all the extended family

SUMMARY

The majority of people in Botswana depend on agriculture for their livelihood. Through extension, the government of Botswana has embarked on several rural development programmes providing farmers with inputs and information on the latest farming techniques to improve productivity. The Agricultural Demonstrators (AD's), trained mostly in neighbouring countries, provided the link between the government and the farmer.

The first institution for training extension workers, Mahalapye Agricultural Training Centre (MATC), was established in 1966 and thereafter the course transferred to Botswana Agricultural College (BAC). The college has since undergone a number of developments and changes. New training programmes have been introduced and additional facilities provided.

Lately senior officers in the Ministry of Agriculture and farmers have complained about the quality of the training of extension workers from BAC and of the theoretical nature of the course which has failed to provide the trainees with the right practical skills. This dissertation aims at evaluating the training of ADs at BAC to determine the basis of these concerns.

Chapter one discusses the importance of agriculture and

its role in rural development in Botswana. I also discuss the physical environment of the country to highlight environmental conditions such as climate, which determine the success of a farming enterprise. Farming systems are also described to explain the farming patterns in the traditional and the commercial sectors.

Chapter two discusses the organization of extension in Botswana to explain the evolution of the approaches currently used. Chapter three outlines the stages in the designing of training programmes. An outline of activities at all stages (in the training cycle), identifying training needs, defining the target group, planning the training, designing the training,implementing the training and evaluation is provided.

The description of the curriculum used in the training of AD's follows in chapter four; the elements in the curriculum are highlighted.

The curriculum content is then analyzed in chapter five. Subject matter is checked for completeness and relevance to the work of the AD. Limitations of the curriculum such as coverage of irrelevant material and lack of use of varied teaching methods are discussed. Chapter six provides suggestions for improving the curriculum. A systematically developed curriculum is recommended. A model curriculum to demonstrate the curriculum process with the four essential elements is provided. In addition, some factors such as shortage of staff, training and staff motivation, which are

related to content but are equally influential to the riculum, are outlined. Suggestions for improving the ining are then provided.

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ABBREVIATIONS

ACDO	Assistant Community Development Officer
AD	Agricultural Demonstrator
ALDEP	Arable Land Development Project/Programme
ARAP	Acceleelerated Rainfed Arable Project
ATIP	Agricultural Technology Improvement Project
BAC	Botswana Agricultural College
MoA	Ministry of Agriculture
NDP	National Development Plan
SLOCA	Services to Livestock Owners in Commercial Areas

INTRODUCTION

Training of agricultural extension workers is an important and necessary function of an extension service if it is to live up to expectations in performing its role of increasing agricultural production. To ensure this effective curriculum that takes care of the needs of the farmers is to be implemented.

Most developing countries have agricultural extension services (Swanson and Jaffer, 1981) but often their effect on increasing agricultural production and farmer income is limited. This is largely because of a shortage of properly qualified extension staff (Maalouf and Contada, 1984) as their training is usually critically inadequate both qualitatively and quantitatively.

In Botswana, the extension worker who is in direct contact with the farmer is referred to as the Agricultural Demonstrator (AD). Prior to entry to a basic (pre-service) two-year certificate agricultural education course, these people are expected to have five years of secondary schooling (with good passes) or, formerly, at least three, now two, years of secondary schooling (junior certificate) with relevant work experience.

The aim of this dissertation is to evaluate the training of Agricultural Demonstrators at Botswana Agricultural

College. I will study the organization of the curriculum to identify the limitations (critical issues) of the structure of the course. I will analyze the content and the strategies used in the implementation of the curriculum -the teaching of the courses. Chapter one gives an overview of agriculture in Botswana; its importance and role in rural development. The physical environment is discussed to explain the situation in which a farmer in Botswana has to exist. Farming systems are also discussed to explain the production patterns in the traditional and commercial sectors.

In Chapter two, I discuss extension and its organization to explain the evolution of the extension services and approaches used today. Chapter three covers the designing of training programmes as a basis for the analysis of the certificate level training programme in chapters four and five. It provides the justification for the limitations identified in the curriculum used in the training of extension workers at Botswana Agricultural College.

Chapter four provides the description of the curriculum to facilitate the study of its organization and the analysis of the content in Chapter five. In the content analysis, subject matter details are examined to check the topics covered for relevance and completeness. Teaching methods are also discussed to determine their appropriateness to the subjects taught. The limitations of the curriculum are discussed in Chapter six followed by suggestions for improving the training of Agricultural Demonstrators at Botswana Agricultural College.

CHAPTER ONE

AGRICULTURE IN BOTSWANA

1.1 The Importance of Agriculture in Botswana

Agriculture is a vital part of the economy of any country and its development is critical to the development of the country's economy as a whole (Garforth and Oakley, 1985). In Botswana, although agriculture is no longer the largest sector of the economy, it is still important as it forms the backbone of the rural economy. Despite the rapid urbanization, four fifths of the total population are still rural and these people depend on agriculture for their livelihood.

1.2 The Role of Agriculture in Rural Development in Botswana

According to Mokone (1989), rural development is a process aimed at improving the welfare of the people in geographical areas characterized by lack of or inadequate social services, and lack of involvement in economic interaction. Thus development must have two 'legs', urban industrialization as one and rural improvement the other (Garforth and Oakley, 1985). For socio-economic reasons, there is a need for Botswana rural farmers to be assisted in their struggle for self-development. About 80% of Botswana is rural; the government of Botswana has established rural development programmes for farmers to ensure that they are well informed of the latest farming techniques for increased

productivity and that farmers are provided with the necessary inputs.

1.3 Physical Environment of Botswana

Botswana is a land-locked country in Southern Africa. It shares the borders with Namibia in the west and north, Zambia and Zimbabwe in the north-east and the Republic of South Africa in the east and south. The country lies between 20° and 30° East longitude and approximately 18° and 27° South latitude. More than half the country lies within the tropical zone, north of the Tropic of Capricorn (Botswana Yearbook, 1982). Botswana occupies a surface area of 582000 km. More than two-thirds of this area is covered by the Kalahari desert. Consequently most of the population of just over a million people is concentrated on the eastern border of the country (Baker, 1988a).

1.3.1 Relief

Botswana is a country of low relief especially in the west. The eastern part of it is characterized by greater diversity in altitudes. This area is covered with hills, valleys and rocky outcrops. The highest point has an altitude of 1489m (Otse Hill) and the lowest altitude is 503m, near the Shashe and Limpopo Rivers.

1.3.2 Climate

Botswana's latitude and its relatively low lying position in the centre of the Southern African landmass result in a climate that is mainly arid to semi-arid. The country may be divided into three main climatic regions: the northern, eastern, and western regions. The Northern region is on 20° latitude south and thus experiences tropical climate with higher rainfall (500-700mm). The eastern region is approximately south of latitude 20° south and east of longitude 25° east. It has a semi-arid sub-tropical climate with lower rainfall (500mm). The western region covers the Kalahari with the lowest rainfall of 400 to 250mm.

1.3.3 Rainfall Patterns

Climate has an important influence on the nature of natural vegetation, the characteristics of the soils, the crops that can be grown and the type of farming in the region. In the tropics the number of diverse types of tropical climate account for the variation in the agricultural potential of the different regions (Webster and Wilson, 1980). In Botswana, rainfall is the single most important factor affecting agriculture (Baker,1988a). In the eastern part of the country, where most arable production takes place, rainfall is derived almost entirely from moist air of the east and north east. Average annual rainfall ranges from over 650mm to 250mm. Most rainfall occurs during summer from October to April and it is mainly in localised intense showers

and thunderstorms. Thus most water from the rain rapidly runs off (NDP 1985-91). Rainfall in Botswana is erratic and thus attempts to predict its patterns have proved difficult (Baker 1988). Dyer and Tyson (1977) identified a 20 year cycle for Southern African sub-continent 10 years of wet and another 10 dry, which has been found not very helpful by Baker (1988) because of the annual rainfall variability.

The high temperatures, hot sunshine and wind (during the months of the highest rainfall) complicate the problem of insufficient rainfall. These high temperatures result in high evaporation and evapo-transpiration. The average maximum temperature is about 33 °C in January and 22 °C in July while extremes can be 43 °C in January and 32 °C in July. The average daily minimums are 19 °C in January and 5 °C in July with extremes of 7 °C and below 5 °C respectively. The lowest temperatures are in the southern and south western parts of the country. There usually is early morning frosts occurring during June to August (Botswana Year Book, 1982).

1.3.4 Soils

Eighty- five percent of Botswana is covered by the Kalahari sands. Consequently, the soils are weakly developed with high sand content and little silt. According to Siderius (1972), Botswana is covered by ferruginous tropical soils with either sand parent material or granitic rock. The soils have low water-holding capacity and are deficient in phosphorus; they have low

by a region.

The livestock sector is predominantly cattle , sheep and goats with cattle production contributing over a third of the national export. Poultry , pig and small animal production enterprises are slowly springing up.

Farmers in Botswana are distinguished by their resources and production methods. The distinction has brought about the subdivisions of the traditional and mainly freehold commercial sectors. This division is also based on a special land tenure arrangement for the white minority (Baker, 1988a).

1.4.1 Farming in the Traditional Sector

Two groups of farmers are involved in traditional farming. One group is of intermediate farmers who cultivate over 10 ha of land, own above average cattle herds (more than two cattle and twelve smallstock) and aim to produce surplus to market (more than 300 kg\ha yield). The second group is characterized as having no cattle and not being able to grow enough food to cover subsistence. Each household's traditional farming practices occur in three separate locations, a home village, an arable residence and a cattle post. The farming is mixed and extensive with very low household inputs. The returns from this type of enterprise are very low in relation to the work involved.

CHAPTER TWO

AGRICULTURAL EXTENSION IN BOTSWANA

2.1 The History of Extension in Botswana

Agricultural extension and research are the means by which information is conveyed to farmers. Information is needed by farmers to increase their own productivity and the productivity of the land. In Botswana improvement of agriculture traditionally came from farmers' observations and trials on their own and until advisory services for boosting agricultural production were set up in 1914. In 1926 the first agricultural officer, a dairy inspector, was appointed. His duties were both research and extension: he was to find the best management practices for dairy production and to persuade farmers to adopt practices (Hobb, 1985).

In 1935, the Department of Agriculture was established to conduct research into crop and pasture agronomy and to consider the development of pig, poultry and forestry production while other livestock production was the responsibility of the Veterinary Department. Emphasis in the 1940's shifted to the small scale (traditional sector) agricultural production. Two small scale irrigation schemes were set up. Batswana staff were appointed to assist and advise farmers until 1947 when a more organized extension service was initiated. This was the Co-operative Demonstration Plot Scheme (Lever, 1970). The main

activity of the extension workers was to hold demonstrations on the farmers' fields (Baker, 1988a). The aim of the scheme was for the demonstration of the improved techniques on farmers' lands to reach more people country wide.

In 1962 the Co-operative Demonstration Plot Scheme extension approach changed to the Pupil Farmer Scheme (a borrowed idea from Zimbabwe, then Rhodesia). In the Pupil Farmer Scheme extension approach, each extension worker had a group of about 25 farmers to advise. To qualify for the scheme a farmer had to own a plough, draught oxen and de-stumped land. As the the farming methods of the pupil farmer improved, he was promoted using the scale of "progressive", "improved", until he became a "master farmer" (Baker,1988a).

The organization of extension activities and the approach changed again in 1970 following consultancies commissioned to examine the Pupil Farmer Scheme (Willet, 1981). The consultants identified several problems, which were related to the administration and management of extension services; for instance, lack of coordination of extension services provided by the Ministry of Agriculture, inadequate supervision of field staff, lack of extension equipment , poor transportation and housing. The Pupil Farmer Scheme was finally phased out in 1976. The current organization of extension is such that extension workers man their own extension areas and use both group and individual extension approaches whenever they see fit. The extension workers also have an option of using other methods such

as demonstrations, addressing village meetings and participating in village proups to communicate extension messages.

2.2 The Organization of Extension in Botswana

In Botswana all agricultural development activities are directed and administered by the Ministry of Agriculture. The Ministry, itself has been re-organized and undergone several changes over the years. Before independence (1966) all agricultural research and extension activities were centered in Mahalapye (Fig) until the Ministry of Agriculture moved to Gaborone, the capital. Research and most agricultural training activities moved on to Sebele, 10km north of Gaborone. The ministry was then re-organized into its current structure of five departments: Crop Production and Forestry, Animal Health and Production Research, Cooperative Development, Integrated Agricultural Development and Ministry Management. The Department of Crop Production and Forestry is responsible for extension services.

2.3 The Department of Crop Production and Forestry

The Department of Crop Production and Forestry has under it nine divisions. There are four levels of staff in the Department of Field Services (Baker, 1988a). These are:

(a) administrators and subject specialists - at the ministry or headquarters.

(b) agricultural officers and specialist officers - in the six

regional agricultural offices.

(c) agricultural officers and supervisors - in the 22 agricultural districts.

(d) agricultural demonstrators - in the 225 agricultural extension areas.

In this arrangement, the extension worker is provided with technical information by the regional specialisat and the information is then expected to trickle down to the farmer.

2.4 The Training of Agricultural Extension Workers in Botswana

Education in the development of agriculture needs to occur at two levels. The first is through the education of manpower such as extension staff and the second is through the training of farmers (Taukobong, 1983). In Botswana the education of farmers is the responsibility of the extension service through the extension worker and rural training centres.

Training programmes for extension workers were established as early as 1967 long before the introduction of agriculture (In 1986) into the secondary school curriculum. Training at that time was provided by the Mahalapye Agricultural Training Center (MATC). The MATC training programme was for three years with six weeks of induction course and one year spent in the field (with farmers) for practical experience. To qualify for

admission at MATC a candidate needed to

- be a National of Botswana
- have attempted standard seven (final year at primary school).
- be physically fit and willing to do manual work
- be at least 18 years of age.

The building of Botswana Agricultural College (BAC) commenced in 1966 when the Ministry of Agriculture (MOA) was to move its headquarters from Mahalpye to Gaborone, the new capital. The certificate level agricultural course transferred (September 1967) to BAC in Sebele.

BAC has since the transfer of the training programme from MATC undergone a series of changes. From 1970 the course was shortened to two years with practical work done in between the terms, during the vacations. In 1970 another certificate level training programme in animal health, was transferred from Rematlabama to BAC , followed by the introduction of yet another course; a one year in-service course for assistant community development Officers (ACDO) in 1971. This course was run by BAC for the Ministry of Local Government and Lands. The two year pre-service training for ACDO's commenced in 1972. As the number of applicants with Junior Certificate's (JC) or three years junior secondary school qualifications increased, the candidates with primary school leavers certificates (standard seven) could no longer qualify.

After the courses transferred to BAC and plans for new programmes (diploma courses) advanced, consultancies to establish a Faculty of Agriculture were initiated in 1979. A number of committees were formed, one of which decided the University of Botswana (UB) was to establish a Faculty of Agriculture at Sebele or elsewhere to offer degree and diploma training and let BAC concentrate on certificate and vocational training or to upgrade BAC into a constituent college under the UB or MoA to cater for all the three levels , certificate, diploma and degree. A year after the commencement of diploma training (in Agriculture and Animal Health and Production in 1982, the MoA accepted a recommendation for BAC to remain associated with the ministry while affiliated to UB. This move was followed in 1985 by the transfer of the ACDO course to UB under a seperate arrangement by the Ministry of Local Governments and Lands, the Ministry in charge. After approval of the academic requirements of the B.Sc. Agriculture degree programme by the UB senate and council in June 1988 respectively the degree programme began in August 1988. A year later a adiploma in agricultural education was introduced. Courses such as a diploma in irrigation engineering and specialist courses for extension staff are to be started shortly.

The establishment of BAC as a Faculty of Agriculture has had an impact on the certificate level training and will continue to affect it as the anticipated changes in the whole college set up come into effect. The curriculum for the certificate training

programmes has since the new developments been reviewed. Some subjects have been removed from the syllabus; new ones have been introduced and subject weighting (hours per subject) has been revised. Entry qualifications have also been reviewed. A candidate no longer qualifies with a junior certificate (JC) only. He needs to have in addition to a JC, one-year relevant work experience; otherwise a Cambridge Ordinary School leavers Certificate (five years secondary school) with a good pass in sciences is required. A summary of training programmes at BAC is illustrated below.

PROGRAMME	YEAR INTRODUCED
Certificate in Agriculture	1967
Certificate in Anim. Health and Prod.	1970
Certificate in Community Dev	1971 (in-service); 1972 (pre-service)
Diploma in Agriculture	1982
Diploma in Anim. Health and Prod	1982
Diploma in Agric Education	1989
Degree in Agriculture	1988
Diploma in Irrigation Eng.	1990 initially proposed not yet established

CHAPTER THREE

DESIGNING TRAINING PROGRAMMES

3.1 Introduction

Designing a training programme is planning and putting together the entire teaching and learning processes, where the length of the courses varies according to the type of knowledge, attitudes and skills and the depth in coverage, of the material the trainee is required to learn.

Nadler (1986) considers the designing of training programmes as "one of the most misunderstood" tasks. Abella (1986) points out that in many instances, people spend far more time, money, and effort than necessary putting together training programmes; "sometimes never getting it right....because they leave out steps, shorten the process, or carry out the steps haphazardly".

Chapter three describes the designing of training programmes; the steps which the designer must work through to make a design which is a definate success. Some models used in the process will be highlighted. The curriculum, a major step in the designing of training programmes will also be discussed.

3.2 Definitions: Training, Education.

3.2.1 Training

Training is a commonly used term which often implies that some type of learning is expected to occur. This learning can be unintentional or intentional and planned. It is a term which, acccording to Laird (1978), is used interchangeably with education by training specialists to describe what they do for their organizations.

Kenny and Reid (1986) regard training as both a synonym for education and a description of restricted sense of learning behaviour which is found in a specific job context. They further define training as

> "a planned process to modify attitude, knowledge or skill behaviour through learning experience to achieve effective performance in an activity or range of activities."
>
> (Kenny and Reid, 1986:3)

3.2.2 Education

Education is learning related to a future but defined job for which the individual is being prepared (Nadler, 1985). It is planned learning which has contrived and purposeful learning opportunities (Rogers, 1986). The element of planning is further emphasized by Wiltshire (1986) when he defines education as:

> "planned processes of learning undertaken by

> intent; the sort of thing that commonly....goes on in classrooms and that involves some who are teachers and some who are taught."
>
> (Wiltshire, 1986:9)

Nadler (1985) attempts to distinguish between training and education by describing training as learning related to the present job of the individual, and education as learning for a future but defined job for which the individual is being groomed.

3.3 Training Models

Training programmes need to be well structured. Their design should not be by trial and error or "hit-or-miss, try it one more time experience". Havelock and Havelock (1973) consider the training programme as "a system with goals, a division of labour, a temporal sequence and definable set of training activities or experience". There is a logical and comprehensive series of actions that need to be taken and all the main design factors are to be adhered to. These factors are listed as:

-planning,

-defining objectives,

-specifying learning that should meet objectives, and

-specifying the sequence of training activities that should lead to the desired learning.

Training programmes thus work as processes with systematic elements. For the processes to be understood, an illustration by models to show the main elements and the relationship between the elements (Deutch, 1966) is necessary.

Builders of models use them to explain what already exists; all of us are constantly building models as we try to make sense out of the everyday world around us (Nadler,1985). This means that there are models already existing which can be used to plan programmes. The selection of the appropriate model depends on the particular learning focused on by the designer. For instance, where training is the focus, the model selected must be related to the job being performed by the individual. In the case of education, the focus should be on the future job (the one the individual is being prepared to do as a result of the learning programme). The interval between the educational programme and the beginning of employment requires the model which contains specific activities which will reinforce the learning during the time lag.

3.4 The Systematic Approach to Training

Systematic training provides for a disciplined approach to facilitating learning. There has recently been an increasing demand throughout the world for trained pesonnel: scientists, technologists, technicians, and craftmen (Mills, 1977). And the type of training required is not attainable from learning which is haphazard, prolonged and morale- destroying. Effective training needs to be cost effective and carefully planned:

> "manpower development through training is of such importance....to economic development (of any nation) that it must be regarded as a branch of economics".
>
> (Mills, 1977:xv)

Systematic training is a deliberate intervention aimed at achieving the learning necessary for improved job performance: it is planning to give people the chance to learn to achieve the results that the job demands (Boydell, 1973). Kenny and Reid (1986) describe planned training as the processes involved in:

(a) deciding whether training can help to resolve or prevent a problem, and if so determining whether training is the cost effective approach;
(b) identifying what learining is needed and setting learning objectives;
(c) deciding which training strategy or strategies to adopt and planning appropriate training programmes and arrangements to meet these needs;
(d) implementing the training and ensuring that employees are assisted to acquire the skills, knowledge and attitudes they require;
(e) evaluating the effectiveness of the learning at appropriate times during and after the training; and
(f) satisfying any residual learning requirements.

Two types of training are essential to produce capable field extension workers: basic pre-service (education) and in-service (on-the-job) training (Contado and Maalouf,1983). But the basic training and education for field extension workers in most Sub-Saharan countries is considered in a study by Nagel and Von Blankenburg (1982) as unsatisfactory: most of the respondents

to the study reported one of the most pressing problems facing extension to be the "unsatisfactory educational level of the extension staff". Thus in-service training has been used mainly as a "quick-fix" to meet immediate deficiencies in the extension personnel with weak or non-existent basic training (Youngman, 1983). This short-term nature of in-service training is regarded by Youngman (1983) as a severe drawback if there is not a strong basis of knowledge, skills and attitudes on which to build. A need for more systematization and coordination in the organization of training as a whole is apparant. Planned (systematic) training seems to be the most appropriate as it can be applied at any level of the organization (Kenny and Reid, 1986), the specific job or to individuals at any level in the organization, whether newly appointed or with long service.

3.5 The Training Cycle and Stages

The systematic training approach, also regarded as an early form of planned training has since its establishment (by the Industrial Training Act in 1964 in the United Kingdom) become a template for most training today. The training was originally based on a four-stage model. The approach, according to the model, was to :

(a) identify training requirements:

(b) specify the training programme;

(c) implement the training;

(d) evaluate the training.

The approach has since expanded to six (Kenny and Reid, 1986) seven (Keynes, 1983) and ten (Boydell,1973; Abella,1986) stage (refer to Figure 1) training cycle when it was reallized that it had limitations when applied in the non-manual skills context. Kenny and Reid, (1986) emphasize the limiting factor in their statement:

> "even in what may appear to be a straight-forward case, training is a complex set of processes which are not adequately accomodated by the four stages model.These complexties can arise both within and between each of the four stages of the cycle and thus a more sophisticated model is required."
>
> (Kenny and Reid, 1986: 14)

The four-stage training cycle was such that, first, training needs were identified and training specified, next would be the implementation of training, and finally the training was evaluated. If evaluation showed that further training was needed, then the four stages would be repeated, as necessary - hence the process being referred to as the training cycle .

The expanded versions of the four-stage training cycle have some stages divided into specific components or steps to emphasize certain elements in the training process. Figure 1 illustrates the six, seven, and ten - stage training cycles.

After a reshuffle of steps in the training cycles and some steps being merged to make single stages, there has evolved a planned training cycle which Kenny and Reid (1986) consider as a clear description of the stages in the application of planned training.

3.5.1 Planned Training and Stages

In the planned training approach, every stage in the cycle requires certain activities to be performed; major decisions are to made to determine strategies which will make the execution (of the activities) possible. Such types of activities and strategies are illustrated in figure one.

FIGURE 1 SYSTEMATIC TRAINING IN TEN, SEVEN, AND SIX STAGES: ADAPTED FROM BOYDELL, 1973; KEYNES, 1983; KENNY AND REID, 1986

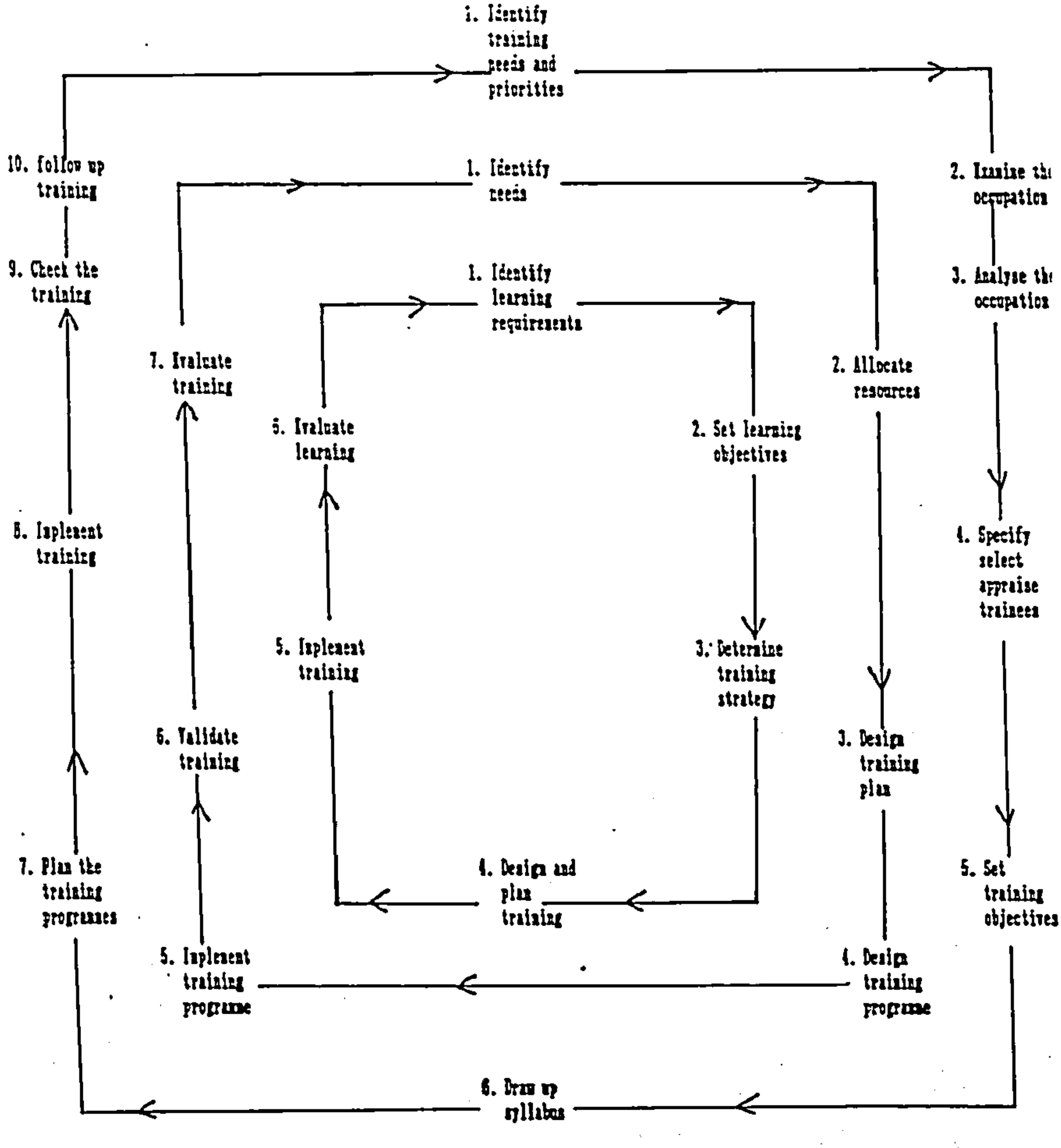


TABLE 1 AN ILLUSTRATION OF THE SIX, SEVEN, AND TEN-STAGE TRAINING CYCLE

ACTION	STRATEGY
Stage 1	
* Identify training needs * Identify learning	* Analyse the job - Prepare the job description - Specify the responsibilities and tasks to be performed in the job * Analyse skills, knowledge possibly, attitudes to identify areas of difficulty which will affect the choice of what to learn and training techniques - peruse staff reports - find out about the trainees and their needs from mangement requests or applications
Stage 2	
* Define target population	* Select the population for whom training is intended. * Determine the training gap - what are the present trainees aptitutes - their current effectiveness? - what is the level to which we aspire to raise the trainees' aptitude through the traininag to be prepared?
Stage 3	
* Plan, prepare training * Set objectives - what must trainees be able to do, and to what standard after training? * Determine training strategy	* Clarify the performance standards; write objectives. * Research subject/topic/job - determine content required to achieve training objectives. * Make lesson plans - specify how the learning will be facilitated - specify the role of the learner.

Stage 4

* Design and plan the training

* Specify how the training need will be met:
  - who is to do the training?
  - what resources are required?
  - time available and what are the other constraints?
  - where will training take place?
  - what evaluation to use and who is to do it?

Stage 5

* Implement the training

* Carry out the training according to agreed programme
* Make adjustments where necessary to suit the learning rates of individuals.
* Present courses and make sure subject matter is
  - relevant
  - interesting
  - motivating
  - well organized
  - professional
* Review training at intervals and on completion,
* Build in experiences and lessons from the review to improve future programmes.

Stage 6

* Evaluate the learning and the training programme

* check out the achievement of objectives
* Use on-training assessment
  - use questions, exercises, tests, etc.
* Monitor trainees' performance immediately after training.
  - follow up the trainees to ensure transfer of learning to the actual job situation.
* If transfer of learning is a problem, identify further needs and return to stage one.
* Prepare remedial training
  - training could be in-service as a follow up to basic or initial training.

3.6 Curriculum Development

When training programmes fail, it is usually because the analysis of the training needs which would determine the curriculum has not been properly performed. Mills (1977) stresses the importance of this step when he states that curriculum is the "scaffolding around which training is built".

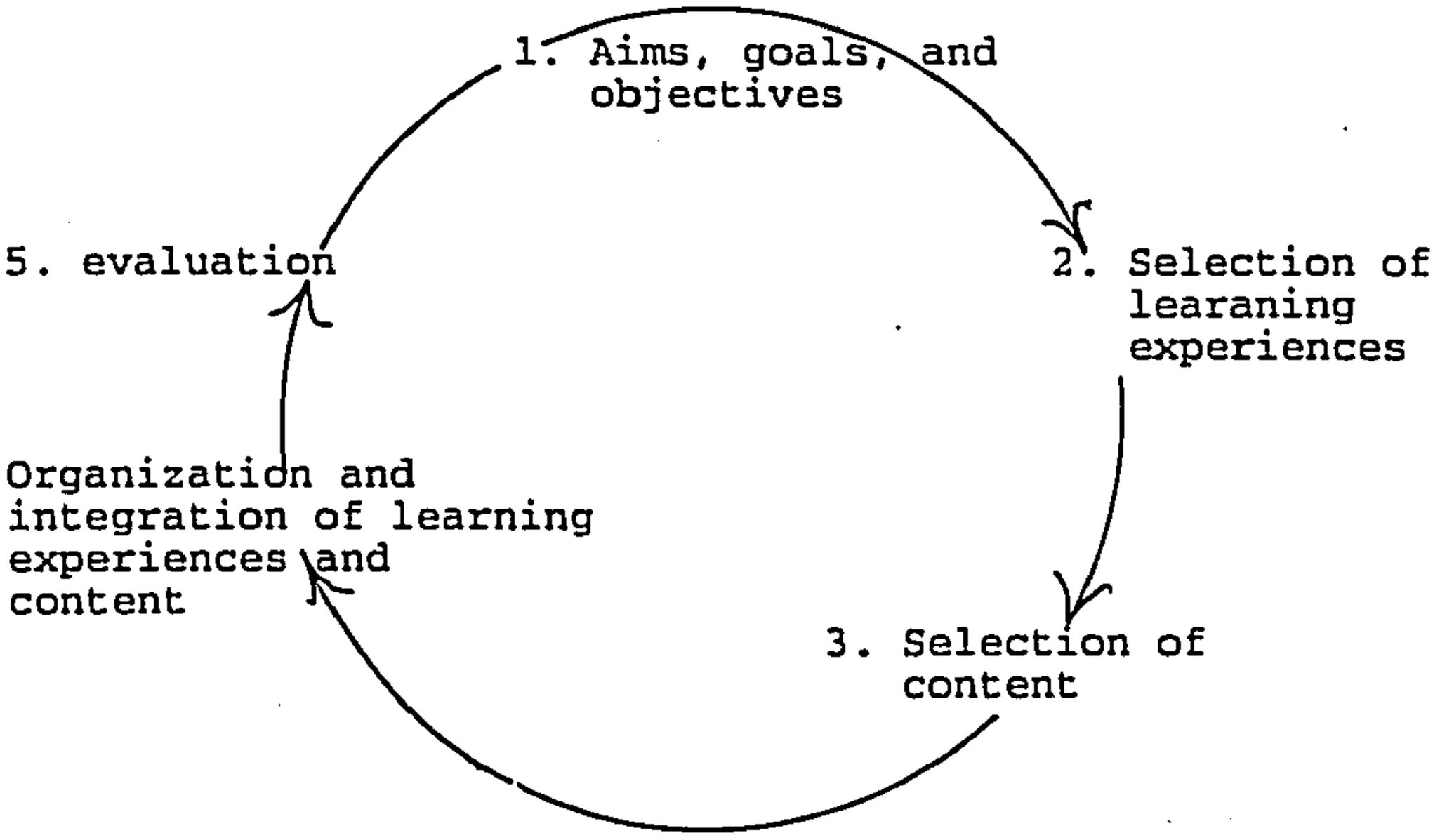
Curriculum development is the stage in the training cycle when we ask such questions as " What should be taught?", "Why?" "How should it be taught?", "To what segment of the population?", and "What should be the relationship between the various components of the curriculum?" These components are escribed by Hill (1982) as: subject matter, objectives, learning activities, and outcomes and their evaluation. The process of curriculum involves the devising of curriculum materials and trying them out, deploying manpower, resources and time. This is the time when trainers establish very clearly what they are trying to achieve with the trainees, thereafter decide how they hope to do this and finally to consider to what extent they have been successful in their attempts. In other words,

> "the planning of learning opportunities intended to bring about certain changes in (trainees) and the assessment of the extent to which these changes have taken place is what is meant by curriculum development."
>
> (Nicholls and Nicholls, 1978 : 14)

There are, however, many different approaches to developing curriculum in a given context. The approach that is chosen,

depends on a complex set of interactions in which four variables are critical (Kenny and Reid, 1986). These are the organization's culture and values, its goals and priorities, the responsiveness of the organization and its training systems and the perceptions and abilities of trainers and trainees. Curriculum development is not an activity which is undertaken once in an institution, college or school and then finished. Rather, it is a continuous process with knowledge and insights derived from assessment being fed back and providing a fresh starting-point for further development. When planning the curriculum it is important to note the cyclical nature of the curriculum development process. The curriculum process consists of five phases or stages(Figure 2).

FIGURE 2 CURRICULUM PROCESS

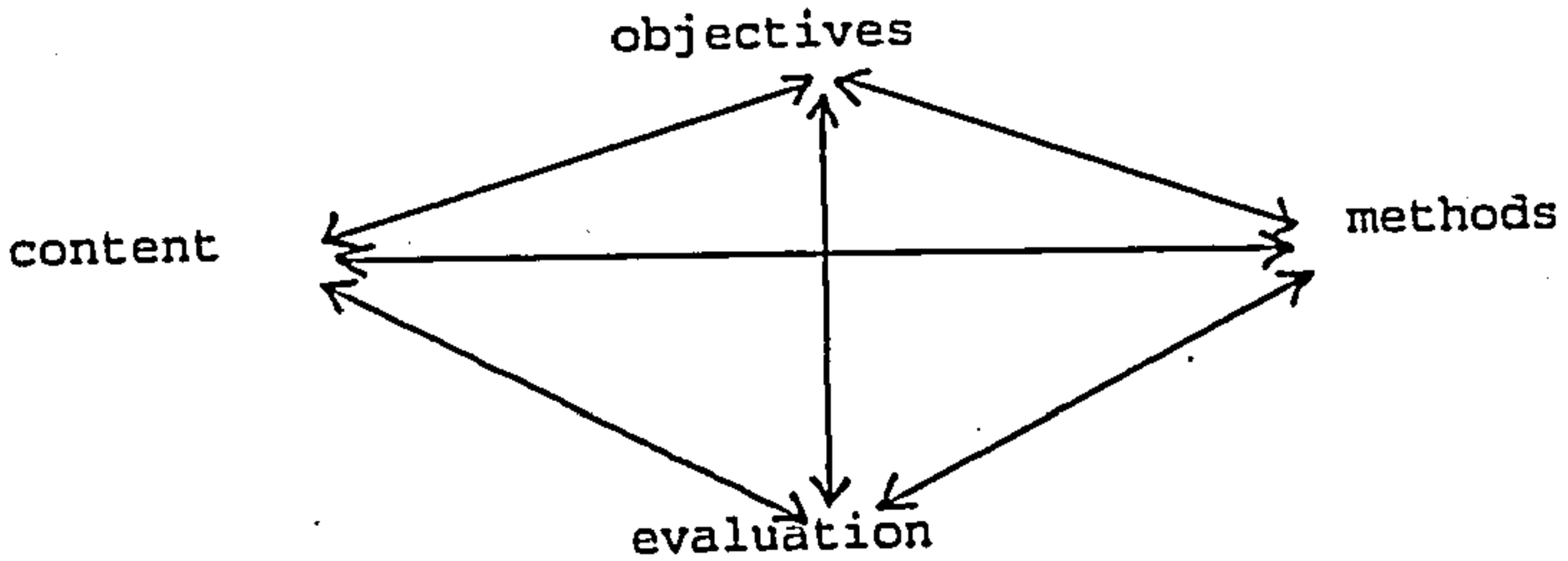


(Wheeler, 1967: 31)

3.7 Curriculum Design and Structure

There is no single design for curriculum. However there are fundamental principles without which the curriculum will lack either structure or design (Warwick, 1975). Johnson(1985) mentions several current designs used by most designers. Generally curriculum has certain key elements whose organization determines the types of curricula. These elements are objectives, content, methods, and evaluation. The four elements are said to be closely interrelated and changes to any one may affect all the others (Nicholls and Nicholls, 1978). The interrelation is illustrated by the following diagram:

FIGURE 3 ELEMENTS OF THE CURRICULUM



(Nicholls, 1978: 16)

Lawton (1973) also identifies two educational ideologies, each of which, he considers, generate different types of curricula. These ideologies, he refers to as the classical and

romantic. The classical has a traditional view of education. The design it generates would be the objectives model curriculum design. The curriculum has knowledge divided into disciplines and objectives selected. Thus a subject-based curriculum is emphasised by the ideology. The romantic educational ideology advocates a pupil-centered curriculum with an integration of knowledge across disciplines. This approach moves away from subjects to be covered to experiences to be undergone. It emphasises a project or activities-based curriculum, hence the process or activities model of curriculum design will emerge.

As Warwick (1975) asserts, the structure of a curriculum is largely subsumed with or emerges from the basic design (whichever it may be); it is a means whereby the ideal is translated into the tangible: the various activities in progress in the classroom. A balance between the selected content and the methods needs to be struck.

> "Whole days given over to nothing but group-work or discovery methods can be every bit as tedious as an unbroken succession of formal lectures or text-book lessons."
>
> (Warwick, 1975: 73)

The correct sequencing of the content (courses or subjects) is also an essential for the structure to be acceptable.

3.8 Determining Content and Strategies

3.8.1 Selection of Content

This stage in the curriculum process bulks largest in educational thinking. Thus the selection of subject matter or content is the principal concern of many curriculum designers (Wheeler, 1967). In teaching, one must teach something to someone. The someone is the pupil and something the content (Nicholls and Nicholls,1978). Content might be described as the knowledge, skills, attitudes and values to be learned and the selection of content is therefore a question of deciding what knowledge, concepts, principles, generalization, theories, techniques and procedures in a particular subject shall be used. The criteria for making the selection are importance, difficulty and relevance to the organization of the field of the subject.

3.8.2 Strategies

When the content has been selected and the syllabus (list of subjects or the outlines of content) drawn, suitable experiences, methods or strategies are designed on the basis of their relevance to that content. For instance, if students are discussing pests of field crops, the pest specimens and what the students and the teacher say or ask about them can be regarded as content, while the discussion might be regarded as the strategy or type of method.

Content and methods come together in a learning opportunity. This might be described as a planned controlled relationship between pupils, teacher, materials, equipment and the environment in which it is hoped that desired learning will take place (Nicholls and Nicholls, 1978). Nicholls stresses this further by noting that

> "the method aspect of the learning opportunity involves the relationships between pupils, teacher and materials, the organization of the content, its manner of presentation to pupils and teacher carryout"
>
> (Nicholls and Nicholls, 1978: 36)

CHAPTER FOUR

DESCRIPTION OF THE CURRICULUM FOR CERTIFICATE LEVEL TRAINING IN AGRICULTURE AT BOTSWANA AGRICULTURAL COLLEGE

4.1 Introduction

Curriculum refers to a programme for a specific subject matter at a particular level of training or the whole programme of different subjects for the entire course or training programme (Ochs, 1974). The term can be used in a wider sense to cover various educational activities through which content is conveyed as well as materials used and methods employed.

According to Urevbu (1985) curriculum is a programme of activities designed so that the learners will attain as far as possible certain educational ends or objectives. However, there is no single format of a curriculum. Four key elements make a curriculum (Nicholls and Nicholls, 1978). These are:

- objectives
- content
- methods
- evaluation

The curriculum for certificate level training in agriculture at Botswana Agricultural College (BAC) was originally developed by the British who formed the bulk of the senior staff at Mahalapye Agricultural Training Centre (MATC) and later BAC. As

such the design of the curriculum, as is the case with that of curricula in many institutions in many developing countries was imported (Simmons, 1980). These curricula in most cases model the exporting countries' educational systems. In Kenya the curricula in the agricultural colleges were found to reflect the agricultural philosophy and traditions learned at universities and colleges in Britain (Wallace, 1975).

Although there have been some changes in the training programme at BAC, the original courses form the basis of the curriculum for the certificate level agricultural training today. Records of the course from 1967 to 1974 are not available. The 1976 ,1977 and 1984 College Handbooks were the first ever produced (Milne, 1976) to describe the course and its content. After 1984, there was a series of curriculum reviews but no final document (handbook) was produced. Changes continue to be made in the curriculum to keep up with the developments at the college.

The curriculum as reflected by the 1974, 1977 and 1984 College Handbooks starts with the course aims and objectives; a course outline, subject descriptions and assessment procedures follow. The curriculum since 1984 is still in a draft form. Thus the current document contains no course aims and objectives; but only the course outline, subject descriptions and assessment procedures.

4.2 Aims and Objectives of the Certificate Course

The aim of the course is to provide a two-year training in agriculture to nationals. The aim is twofold: in practical classes, the course aims at enabling students to acquire the essential practical skills needed by Agricultural Demonstrators (AD's) and to demonstrate the subject matter which is taught in the classroom. The theory aims at providing students with a sound, basic knowledge of the principles of agriculture.

4.3 The Course Content

Course content for the 1970 to 1988 programmes extended over six terms, each having 11 to 12 weeks, including 1 week for examinations. The content was taught in seven periods per day in five week days. Each period was 50 minutes long which added up to about 2100 hours of training.

The certificate level courses have currently (since 1988) changed to the semester to syncronize the old BAC programmes with the new. The course is now taught in four semesters in two years. Each semester is 16 weeks long, including one examinations week. The programme structure shown in Table outlines the subjects and hours per semester, and the distribution of hours between theoretical and practical subjects (50% allocation for each).

TABLE 2 SUBJECT OUTLINE FOR THE 1988 - 1991 PROGRAMMES

YEAR 1

Semester 1	Total Hours	Hours/Week (theory-practical)
Biology	75	3 - 2
Chemistry	60	2 - 2
Mathematics	60	4 - 0
Genetics	15	1 - 0
Communication skills	30	2 - 0
Anatomy & Physiology	60	2 - 2
Animal Husbandry	30	0 - 2
Introduction to Crop Production	60	2 - 2
	360	16 - 10 = 26
Semester 11		
Animal Breeding	15	1 - 0
Rural Sociology	15	1 - 0
Animal Nutrition	60	2 - 2
Range Management	75	3 - 2
Soils & Soil fertility	60	2 - 2
Crop Protection 1	60	2 - 2
Farm Workshop Skills	30	0 - 2
Field Crop Production	90	3 - 3
Surveying & Land Use	60	2 - 2
	465	16 - 15 = 31

YEAR 2

Semester 1	Total Hours	Hours/Week (theory-practical)
Crop Improvement	15	1 - 0
Intro. to Ag. Extension	30	2 - 0
Crop Protection 11	60	2 - 2
Horticulture	90	3 - 3
Animal Production 1	105	4 - 3
Crop Production 1	45	1 - 2
Speech and Visual Aids	30	0 - 2
Soil & Water Conservation	60	2 - 2
Agricultural Project	30	0 - 2
	465	15 - 16 = 31

Semester 11		
Basic Agric. Economics	45	1 - 2
Applied Agric. Ext.	90	2 - 4
Crop Prod. Machinery 11	45	1 - 2
Agricultural Project	30	0 - 2
Tractor Maintenance &	45	1 - 2
Farm Structures &	45	1 - 2
Animal Production 11	75	2 - 3
	345	8 - 17

4.4 Assessment of Student Performance

Evaluation of student performance is by continuous assessment comprising theory and practical tests, laboratory reports, assignments and field reports. Continuous assessment carries 60% of the overall assessment for the course while end of semester examinations account for 40%. The overall performance is assessed by the Percentage Scale System as illustrated in below.

Grade A	80% & above	Excellent
Grade B	70 - 79%	Very Good
Grade C	60 - 69%	Good
Grade D	50 - 59	Pass
Grade E	49 - below	Fail

To graduate a student needs an overall weighted average of D and above. The certificates are classified as:

Pass with distinction	75% or above
Pass with credit	65 - 74%
Pass	50 - 64%
Fail	49% and below

4.5 Teaching Strategies

The teaching of theory occurs entirely through lecturing to classes of 30 to 45 students. Occasionally students are engaged in discussions and exercises in subjects such as mathematics and communication skills. Slides and film shows and lectures by staff from the Ministry of Agriculture and some of its departments often feature.

For practical lessons students are divided into groups of 9 to 15. The size of the group is determined by the course enrolment and or/the number of teachers specializing on a particular subject. Usually all teachers conduct their own practical lessons. Some practicals take place in the laboratories, workshops, and nearby villages. Crops subjects have their practicals at the college fields, gardens and orchards. For Animal Husbandry, students work with animals (cattle, sheep, goats, pigs and poultry) at the college farm. The teaching of practicals involves the teacher in explaining and demonstrating skills and concepts to groups of students. The students thereafter engage in group exercises to practice the skill.

4.6 Teaching Staff

BAC has always had a shortage of teaching staff. At the time the college was established (1967) there was a handful of the local staff teaching. The rest were expatriates who filled

most of the higher teaching positions (lecturer or instructor) and thus most locals ended up in the instructor or assistant instructor positions. Their duties were mainly the setting up and conducting of practical lessons. The staff establishment is currently improving with more technically qualified staff being recruited by the college (Table).

TABLE 3 STAFF SITUATION AT BAC IN OCTOBER 1988

Qualifications	Locals	Expatriates	Total
Staff with Diploma and Certificate	10	0	10
Staff with Bsc	17	2	19
Staff with Bsc & Msc	6	3	9
Staff with Bsc Msc & PhD	0	4	4
	33	9	42

Note: The number of local staff since 1988 is likely to be similar as few leave for further training and some come back from training. The expatriates must have increased because of the latest recruitment exercise.

The local staff at BAC will normally have received their training from BAC, University of Botswana, University of Swaziland, and universities in America, Britain and various African countries.

The college expects to have recruited 55 teachers by 1991. The teaching staff will be categorized into two groups. This is because of the current plans to establish BAC as a College of Agriculture under the University of Botswana. Category one will

comprise of staff appointed on university terms: the lecturers, associate professors and professors to teach in the university accredited programmes. Category two will consist of staff who will teach in the certificate programmes. These people are expected to have at least a B.Sc. qualification. Of the 55 to be recruited by 1991, 20 are to teach in the certificate programmes.

The completion of recruitment is expected to relieve the college members of the work overload. Staff will not be expected to teach across levels. Reduced teaching hours will enable teachers to have enough time to plan, organize lessons and have enough time to update notes and do research.

CHAPTER FIVE

EVALUATION OF THE CURRICULUM CONTENT FOR THE TRAINING OF AGRICULTURAL DEMONSTRATORS AT THE BOTSWANA AGRICULTURAL COLLEGE

5.1 Definition of Evaluation

Curriculum development is defined (Chapter 3:29) as the stage at which trainers establish very clearly what they are trying to achieve with the trainees, thereafter decide how they hope to do the training and finally to consider to what extent they have been successful in their attempt. This is the evaluation stage, the final phase in the curriculum process during which conclusions about the success or failure of the educational programme are made (Wheeler, 1967).

Evaluation is the process of ascertaining the decisions to be made, selecting relevant information, collecting and analysing the information in order to report data useful to decision makers in selecting among alternatives (Alkin,1970). At its simplest, evaluation is the process of applying a set of standards to a programme, making judgements using the standards, and justifying the standards and their application (House, 1985). According to House, there are many ways of using standards and their application. Often the evaluator or initiator of the evaluation determines the standards.

MacDonald (1975) highlights key issues in curriculum evaluation when he defines it as:

"The process of conceiving, obtaining and communicating information for the guidance of educational decision - making."

(Skilbeck, 1975 : 133)

The key issues are first, the fact that evaluation ought to have a purpose (that of informing decisions about a particular curriculum or programme), and secondly, that there are no self-evident guidelines for the selection of information and methods for evaluation. The implication is that there are many ways or methods of curriculum evaluation. None of the methods is more correct than another (Skilbeck, 1975).

According to Urevbu (1985), the method of evaluation used can be either formative or summative depending on the stage in the curriculum development process at which the evaluation is conducted. Formative evaluation is conducted to provide data used to form a better finished product. It can take place at a number of intermediate points during the development of a curriculum and can be applied to specific aspects of a curriculum; for example, evaluation at the implementation stage.

Summative evaluation takes place at the completion of the curriculum development process to provide terminal judgements on the completed product. However to establish an evaluation exercise that will provide useful information for decision making and judgements of educational programmes, certain concerns about the programmes are to be considered

(Bondi and Wiles, 1979). These are:

a) The school (college) programme should be systematically planned and systematically evaluated.

b) Learning opportunities should reflect the aims of the school (college).

c) Balance should be maintained among all of the goals of the school (college).

d) Continuity among learning experiences be promoted.

(e) Flexibility in the curriculum should be both encouraged and utilized.

(f) Each learner should be provided for adequately.

By making the required observation of the concerns, the evaluator gets an idea of what to analyse. For example, a comprehensive evaluation of a college programme would require an analysis of all areas capable of affecting it. The evaluator in this case should analyse student performance, staff development patterns, parent - community feedback, policies and regulations, utilization of facilities and resources, design of the curriculum, effectiveness of instruction and administrative procedures and many others (Bondi and Wiles, 1979).

5.2 Content Analysis

5.2.1 Course Aims and Objectives:

The aims and objectives of the BAC certificate level agricultural course have not been included in the draft. It is not clear whether the current curriculum process is to occur in isolation of the aims of the training or whether the

aims will be included once the final curriculum document is drawn.

Whatever the design, the curriculum process needs to begin with the aims of the course which will explain what it is hoped the course will achieve. It is from these aims that the objectives, what the students will be doing at the end of the course or period of study are derived (Nicholls and Nicholls, 1978). The more specific classroom level objectives can then follow. These describe the learning that is required for the students to achieve the experience specified by the course objectives.

Once the aims and objectives are sorted out, content and teaching methods or strategies can be selected to provide the students with the appropriate learning experiences (Wheeler, 1967). According to Warwick (1975), including the aims and objectives in the curriculum motivates the students: everyone needs a purpose in life and a meaning for whatever activities they pursue. Thus, both the teachers and students need to know the purpose, direction and structure of the curriculum. The learning experiences provided for the students must be related to the overall aims and objectives stated in the curriculum.

5.2.2 Subject Descriptions

Overall, subjects are adequately described; except in

instances where a list of topics are provided under each subject with little detail of what exactly should happen in the classroom, how the content described is to be delivered, and what will be the role of the trainees during the lesson. Some subject details are provided in Appendix ( ) to show the listing of the topics.

5.2.3 Relevance of Topics Covered

Relevance of the topics is discussed in relation to the work of the AD and the farming in Botswana. Throughout the course as indicated in the subject descriptions certain topics of no relevance are taught and receive emphasis not deserved. Topics such as wheat, rice, soyabean, rapeseed, outlined in Field Crop Production, do not deserve coverage in the course content for ADs. According to a study by Baker (1988a), the most important and preferred crops in Botswana are sorghum, maize, cowpeas, millet, jugo beans, melons, watermelons and sunflowers. Thus the AD is not likely to deal with any wheat or rapeseed related problems once in the field. In Crop Protection 1, practical lessons emphasize chemical control measures when farmers do not use chemicals to control pests. Farmers are looking for control methods which will not cost money. Another example is of the topic "weed control methods" under Crop Protection 11; a notation "as in Crop Protection 1" follows the topic while no reference about weed control methods is made in Crop Protection 1.

Generally, subjects are not described adequately enough to give a clear indication of what goes on; for example Soil and Water Conservation practical activities are visits to observe listed aspects of conservation but there is no indication of what students will be doing besides observing and the places to be visited are not mentioned. The same applies to Applied Agricultural Extension practical. According to the course description, little is done during the 60 hours of instruction.

Tractor driving, a practical topic under Tractor Maintenance and Operations subject is another example of a subject not meeting the needs of the ADs. The amount of practice provided the students is not enough to make them confident enough to pass the test and get a tractor driver's licence and thereafter perform the day to day farm activities. At the end of the practice, students cannot hitch implements onto the tractor and neither can they be trusted to do any driving on their own.

The other thing is that a small number of farmers in Botswana own tractors. The majority uses donkeys and oxen for draught power. Animal drawn implements, maintenance, harnessing and practical use deserves more emphasis in the course. Actually most topics in engineering courses cover highly mechanized practices and lack relevance; for example, engine overhauling,assembly and maintenance, layout of tractor engines, well design and operation, farm power sources, pumping equipment, types of pumps and operation, power

operated tools, plumbing, tap and die equipment. Topics such as animal housing and storage structures are included for practical lessons but there is no sign of such structures in the workshop or engineering laboratories built by students.

5.2.3 Subject Groups

The subjects offered at certificate level training at BAC can be divided into three categories. These are:

Foundation Subjects

Subjects	Total Hrs	Hrs/week/ semester 16 weeks theory-practical
Biology	75	3-2
Chemistry	60	2-2
Mathematics	60	4-0
Anatomy and Physiology	60	2-2
Genetics	15	1-0
Communication Skills	30	2-0
Animal Husbandry	30	0-2
Introduction to Crop Production	60	2-2

Applied Subjects

Animal Breeding	15	1-0
Rural Sociology	15	1-0
Speech & Visual Aids	30	0-2
Soil & Soil Fertility	60	2-0
Agricultural Projects	60	0-4

Basic Agric Economics	45	1-2
Crop Improvement	15	1-0
<u>Job-Oriented Subjects</u>		
Animal Nutrition	60	2-2
Range Management	75	3-2
Crop Protection 1	60	2-2
Farm Workshop Skills	30	0-2
Field Crop Production	90	3-3
Surveying & Land Use Planning	60	2-2
Intro to Agric Extension	30	2-0
Crop Protection 11	60	2-2
Horticulture	90	3-3
Animal Production 1 (ruminants)	105	4-3
Soil & Water Conservation	60	2-2
Applied Agric Extension	90	2-4
Tractor Maintenance & Operation	45	1-2
Farm Structures & Services	45	1-2
Animal Production 11 (non-ruminants)	75	2-3
Extension Field Training	14 weeks during vacation	

5.2.3 <u>Subject Sequence</u>

The classical and most common arrangement of agricultural content begins with the foundation subject, proceeds to the applied subjects and then to the more or less job-oriented subjects (FAO, 1985). The course content at the certificate level training in agriculture spreads fairly well over the two years. All the foundation subjects are offered in the first

year semester one and the applied and job-oriented subject appear mostly in semester two, year one and semester one and two, year two, respectively.

5.2.4 Subject Titles

Some subjects do not clearly indicate what the subject entails or are often too descriptive giving the impression that what the title states is all that is covered in the material. Subject titles such as Soils and Soil Fertility, Basic Agricultural Economics and Record Keeping, Speech and Visual Aids and Agricultural Projects are a few examples.

5.2.5 Subject Time Allocation

The overall instruction adds up to 1645 or 2135 hours after adding the 14 weeks of extension field training. The distribution of hours is 420, 240 and 985 for foundation, applied, and job-oriented subjects respectively. The distribution in percentage is as illustrated below:

Subject	Total Hours Instruction	%Hours of Instruction	%Hours FAO,1985	Total Hours Theory/Practical	
Foundation	420	25.5	30	16	10
Applied	240	14.6	40	6	10
Job-oriented	985	59.9	30	32	39

Extension field training is completed in 490 hours while other practical work is covered in 85 hours. The 2-year programme is completed in 2135 hours which is just about what is recommended by FAO, 1985 (2240).

5.2.6 Relevance of Teaching Methods

The perpetual use of the lecture as the sole method of instruction in the training of ADs is a bad approach to teaching. The lecture method does little justice to the teaching of agriculture, especially the teaching of job-oriented subjects which require students to engage in the practice of skills.

There are many methods of teaching agriculture (FAO, 1985). Some of the methods recommended by Olaitan (1984) are demonstrations, discussion, problem-solving, field trips role playing and exhibition. A teacher can use a variety of methods to relieve daily routine, generate, interest in the course and motivate students to learn. The teaching of practical subjects varies methods to a certain extent. The problem arises when some activities involve the same strategy such as film and slide shows at the expense of methods which could be more applicable. In methods like field trips, lack of planning is a problem. Hosts are sometimes not notified in time; students might not be briefed on what they should expect to learn and other times the teacher himself does not have a clear objective of the field trip.

5.3 General Curriculum Limitations

The curriculum development and implementation has not been systematic; the design has no basic form as subjects are juggled around; some pulled out; others added and hours reduced and increased here and there without reasons to justify the changes. As observed by FAO (1985), this has been the trend over the years. As a consequence, the curricula of many institutions require major surgery to make them relevant.

The BAC curriculum for certificate courses needs to be re-developed and designed as it is almost non existing in the form it is. The curriculum package includes only the syllabus and the course schedule; no detailed description of content covered: a very serious omission. Curriculum is not operational without content description, teaching methods and purpose (Urebvu, 1985). It is because of the curriculum that the training of ADs in BAC is found to be inadequate and superficial (Baker, 1988). Subject matter relevance and coverage is questionable. Most lecture content is derived from old notes, handouts and references. Emphasis is mostly placed on the wrong topics which have no significant importance to the work of the AD or the life of the farmer he advises. The teaching of out-dated subject matter is attributed to the failure of the BAC teachers to collect up to date ideas about agriculture, farming practices and extension methods (Baker, 1988a).

The training of ADs has also been found to be more theoretical. This is why most extension personnel in Botswana are not adequately prepared for their jobs (Baker,1988) and Mosienyane, 1990). Most job-oriented practical subjects such as Practical Farm Work (was in the 1967 to 1970s syllabus) have been replaced by more theoretical science subjects. The new syllabus has introduced Agricultural Projects which will be run almost the same as the Farm Work was. This does not solve the problem as there is still a need for trainees to be involved in project work, an equally important part of practical training of extension workers (Olaitan, 1984).

Some practical courses in the certificate programmes are extension field practice (vacation work), practical extension teaching methods and outreach (students working during the semester with farmers in the surrounding villages). Occasionally, the topics outlined are not necessarily covered in the lessons and there would also be no indication of how much time is spent on a topic. For instance, organizing field days is a practical activity by students doing practical extension methods. Since 1988, students have not had field days, yet the activity still appears in the subject description and topic outline.

Inadequate planning and supervision of practical work is also a problem. In most cases extension field practice, for instance, is not properly organized, placement of students is done late and assignments are put together on short notice

thereafter making assessment difficult if not impossible.

There is also no indication that students engage in practical lessons relating to such topics such as programme planning, annual plans, fact finding surveys, planning and the demonstration of extension methods Preservation of fodders, listed under Animal Nutrition is another example of a topic which might not be necessarily covered during the practical lessons.

Practical training for certificate programmes at BAC is provided for: practical subjects account for 50% of the instruction throughout the training. The organization of the activities, the supervision of practical work, and the teaching seems to be the problem.

Because of the non-existing course aims and objectives from certificate programmes the organization of learning activities is difficult. Both teachers and students are sometimes in the dark and are not aware of the direction the training is taking. For instance, in early 1990, the Syllabus Review Committee when introducing a course during which students would engage in more practical work, needed to decide whether to entitle this course Agricultural Projects of Farm Practical. The issue was that if the course title was Farm Practical the students activities would be in the early morning (5:00 or 5:30) before the normal morning lessons (7:40) began. Not many teachers were prepared to start

lessons as early as 5 o'clock and neither were the students prepared to wake up early for Farm Practical. Eventually, the course was entitled Agricultural Projects: students were to rotate around the four subject departments of Crop Production, Agricultural Economics and Extension, Animal Health and Production, and Land Use and Mechanization. When the lessons began (second semester, year two). practical activities were mostly selected at the convenience of the department handling the Agricultural Projects in the particular time; that is, if the staff did not feel up to working in the field, students would do some work or exercises in the classroom and would not question the teacher's methods.

CHAPTER SIX

DISCUSSION

There are two areas in which the trainee agriculturist has to develop: the theoretical, conceptual area and the practical area. The study of relevant scientific disciplines, agricultural sciences, and economic theory provide for the former. But to impart practical skills and to build up an initial experience in agriculture during training poses problems (Dick, 1971). Hence the claim that the training offered by many agricultural institutions is too theoretical and not designed to solve the practical problems of the community to be served (Benor and Harrison, 1983; FAO,1985). The curricula used in the agricultural institutions often have little relevance to the intended beneficiaries in their existing situation (Zarraga, 1984) with training that attempts to cover a wide range of subjects and practices which are difficult for trainees to remember for long.

In Botswana, poor performance of extension workers is attributed to poor training (Nagel and von Blackenburg,1982; Ramolemana and Hobbs, 1984). According to a study by Ramolemana and Hobbs (1984), areas needing attention are pre-service and in-service training. Pre-service training is not providing the necessary practical experience while opportunities for in-service training are often not available.

Content analysis in chapter five of this dissertation aimed

at identifying the causes of poor job performance of AD's as reported by Baker, (1988b), Mosienyane (1990) and others. Poor curriculum planning and development is considered to be the cause of the superficial subject matter and failure of the curriculum to provide adequate training. According to Warwick (1975) a curriculum without a basic design is "a nonsense", and an unstructured currriculum, "a contradiction in terms".

Because of the many changes in the agricultural extension work in Botswana, pre-service training at BAC also needed to change to re-assess its emphasis and direction (Hoare and Hurley, 1977). For instance, in 1988, the certificate courses changed from the term to semester system to run at the same time as the new degree programme. To provide for this change, the syllabus review committee adopted what Warwick (1975) referred to as the "big-bang" theory which assumes that once one single aspect of the curriculum is changed other factors affecting it fall in place. Problems arose: extension field training needed re-scheduling, and the rest of the curriculum needed reviewing.

6.1 Model Curriculum

In view of the limitations already cited, a well designed curriculum is required to improve the current status of the training of ADs at BAC. A curriculum which is systematically planned can be developed, having all the four necessary elements, objectives, content, methods, and evaluation (Nicholls and Nicholls, 1978). A model curriculum is provided to illustrate

the curriculum development process (see Appendix 2). It shows how to lay a detailed content, selection of methods and student activities.

AD's require more training in practical extension methods (Bamboleman and Hobbs, 1985). Thus agricultural extension is used as an example in the model. The treatment given to the subject in the model is applicable to all other subjects. A complete curriculum package would have details of all subjects and would be a larger document. To have the curriculum re-designed at BAC, it is suggested that a consultant and more teaching staff must be involved in the development process. The development exercise can be undertaken during the school vacations when students are on longer extension field practice and the MoA should be prepared to pay the consultant. Committee members are staff already on pay roll, thus the only extra payment which might be required is the payment for working beyond official working hours. The funds should be provided by the MoA.

6.2 Curriculum Limitations (not content related)

Other factors not related to curriculum content have been found to affect the structure and implementation of the curriculum (FAO, 1985; Mnyau, 1988). These factors emit from the school, college or institutional "climate". The school "climate" is defined as the total of values and attitudes held by those in the school within the relationship that exists, and thus everything the school reflects (Nicholls and Nicholls, 1978).

According to Nicholls and Nicholls,

> "because of its all-pervading nature the school climate will influence every aspect of the curriculum- choice of objectives, content, materials, methods and evaluation".
>
> (Nicholls and Nicholls, 1978: 29)

The school climate usually develops slowly, but may be changed considerably by a change in the school administration, new heads of departments and a large number of new teachers.

At BAC, the training of AD's is believed to be constrained by the curriculum; the selection of content, strategies and methods, and the implementation of the curriculum, the teaching of the content and factors such as:

1. <u>Shortage of teaching staff:</u> It has not been possible to recruit enough teachers to handle both the old certificate and diploma courses together with the new programmes. Consequently one staff may often be required to teach in all programmes (across levels) in the college and carrying an overload of teaching hours.

2. <u>Inadequate orientation of staff:</u> the orientation of new teaching staff, especially the local, is mainly the provision of an office space and everything else is expected to fall in place. If the new teacher is a graduate in economics for example, he will be expected to teach economics courses. How he teaches the courses, the methods he selects, the topics he covers and the chosen emphases depends on his resourcefulness and what he

gathers himself. Nothing is organized to familiarize the new teacher with the college; for instance, a tour of the college facilities and the area served by the college in the case of BAC, the whole country. Mostly the new teacher will not even have proper accommodation.

3. Adequate planning for staff development: provision for inservice training, especially training in teaching methods of skills has been very sporadic. Such training occurred only in 1980 (courses run by the Wolverhampton College of Education, UK) and 1985 run in Botswana by the Institute of Development Management (IDM) at the request of BAC. Long term inservice training to update staff's knowledge and skills in the subject they teach has since 1984 become almost non-existent. Very few teachers have gone away on this type of training. The current changes and upgrading of the college have not changed the situation.

4. Staff motivation: Staff morale is generally low because of lack of training and opportunities for professional advancement. Opportunities for promotion and career paths for teachers are bleak.

5. College administration: Involvement of staff, particularly junior staff in decision making is very minimal. Thus staff are often forced to distance themselves from college issues. Staff lack a sense of commitment and, generally administration at BAC has not been conducive to congenial relations between senior and

junior staff.

6. Insufficient monitoring of the overall training: heads of departments do not monitor classroom activities to find out if what is expected to be taught (as outlined in the individual subjects by teachers) is actually being covered in the lessons. Teaching performance is also not evaluated.

6.3 Suggestions for Improving Training at BAC

In order to improve the training at BAC, the curriculum needs to be re-designed and the college "climate" corrected. To ensure the changes in the "climate" the following suggestions are made:

1. Heads of departments must be trained in personnel management to be effective counsellors of the junior staff, ensure congenial working relationship and improve general staff morale. In that way staff participation in general decision making and commitment can be encouraged.

2. Adequate teaching staff must be recruited. At least 15 teachers to be responsible for the teaching of certificate courses only would improve the situation at BAC.

3. Regular in service training in teaching methods and other related technical skills must be provided for the teaching staff, provision for staff development is essential. This

will give teachers an opportunity to further their knowledge to higher degree level and provide professional advancement and promotion.

4. Teaching staff must be encouraged to participate in professional associations, short courses and overseas tours. A budget for such tours exists. Pertition to raise the budget is to be made to the MoA as funds tend to run out before staff (especially junior staff) get to visit anywhere.

5. A system of teaching staff evaluation must be set up. This evaluation must check staff performance in class. Staff can be evaluated by students towards the end of each semester. At the end of the programme all reports for each teacher can be put together and whatever is the result can be discussed by the subject head of department and the teacher. Teacher methods evaluation should not be for promotion or demotion but for helping to determine the individual teacher inservice training needs, encouraging him to improve professionally.

6. Practical training for certificate programmes should be better supervised. One of the teaching staff can be appointed and made responsible for the job. The teacher chosen should have a minimal teaching load and the motivation for the job. The officer should be paid an allowance for supervising the practicals. Supervision for

practicals can be on rotational basis to allow for all staff interested to participate.

7. The current extension approaches used in Botswana are to be re-examined and the job descriptions for the AD's need updating in order for an accurate training needs analysis to be conducted. That way relevant initial and inservice training can be provided on the basis of a thorough needs analysis.

8. Subject specialists who are to implement the training must have all received training in teaching methods. Currently BAC teaching staff (who do not attend regular refresher courses in teaching skills) provide the bulk of the training of trainers or the inservice for the AD's. Consequently AD's performance does not improve as the inservice training merely subjects him to the same uninteresting routine methods and information which is highly technical and irrelevant: Naturally, a teacher the second time around, tries to impress on the AD that he has improved and knows more; the AD is impressed but does NOT learn much.

9. Before placement in the field the new AD's could be attached to a more experienced AD or Agricultural supervisor for at least three months to learn on the job. This can be effected by a recommendation to the MoA by BAC; otherwise, the exercise can be funded by BAC under extension field training

funds. A justification report by BAC to the MoA could get additional funds.

The training of AD's at BAC is expected to improve if suggested changes are effected. The curriculum is to be designed, implemented and evaluated; attitudes of both students and teaching staff should also be encouraged to change favourably. In addition, good human relations is to be cultivated and an appropriate administration style is to be adopted. A college curriculum does not exist in isolation; thus, all factors affecting the curriculum used in the training of AD's should change in order for the AD to be effective in his job as an extension worker who deals directly with farmers.

APPENDIX 1

Crop Protection I (60 hrs) (2-2)

Theory

Biology, identification and classification of crop pests. Damages caused by pests on crops (i.e. in the field and storage). Control methods for field storage pests. Reference pests - insects, mites, birds, rodents and nematodes. Reference control measures - biological, genetics, physical, mechanical, cultural, legislative/regulation, chemical and emphasis on integrated pest management.

Practical

External anatomy of an insect (grasshopper as a representative insect) to study body regions, and appendages with emphasis on mouth parts and wings. Survey of fields to identify damages caused by different pests on crops. Identification and classification (up to order) of insect pests on the basis of mouth parts, types of wings and legs. Pest control methods with emphasis on chemical control. Different types of pesticides, formulations, application methods and equipments (knapsack sprayer, granule applicator, soil injector). Care of granary and preparation of grain for storage. Visits to see different methods/techniques of storing grain.

2. Crop Protection II (60 hrs) (2-2)

Theory (covers)

Study of plant pathology concepts, pathogens (ie. biotic pathogens including parasitic and non parasitic higher plants). Damages caused on crops. Epidemiology; Disease and weed control methods as in Crop Protection I.

Practical

Survey of fields to identify and differentiate diseases from injuries and damages by pests. Collection, mounting and identification of common arable weeds of Botswana.

3. Soil and Water Conservation (60 hrs) (2-2)

Theory

Dam haffins, catchment tank construction plans, the hydrologic cycle, rainfall and crop production in Botswana. Basic principles of irrigation, irrigation methods. Drainage systems and water, storage techniques, water harvesting techniques. Principles of soil conservation. Soil erosion control.

Practical

Visits to conservation sites to observe and study the following - woodlots, contour banks, graded earthbanks, grass-strips, grassed water-ways, gully control structures, dams, haffirs and

2. Crop Protection II (60 hrs) (2-2)

Theory (covers)

Study of plant pathology concepts, pathogens (ie. biotic pathogens including parasitic and non parasitic higher plants). Damages caused on crops. Epidemiology; Disease and weed control methods as in Crop Protection I.

Practical

Survey of fields to identify and differentiate diseases from injuries and damages by pests. Collection, mounting and identification of common arable weeds of Botswana.

3. Soil and Water Conservation (60 hrs) (2-2)

Theory

Dam haffins, catchment tank construction plans, the hydrologic cycle, rainfall and crop production in Botswana. Basic principles of irrigation, irrigation methods. Drainage systems and water, storage techniques, water harvesting techniques. Principles of soil conservation. Soil erosion control.

Practical

Visits to conservation sites to observe and study the following - woodlots, contour banks, graded earthbanks, grass-strips, grassed water-ways, gully control structures, dams, haffirs and

Practical

Identification of various feedstuffs; feeding practices; processing and preservation of fodder, calculations of rations, etc.

6. Extension Field Training (14-16 weeks)

Orientation on the agricultural programme in the country. Attachment to agricultural field staff, and other organizations involved in agricultural activities (agricultural industry) in the country one of the most important job-oriented subjects; description does not state exactly what happens. What the student is expected to do or learn.

7. Field Crop Production (90 hrs) (3 - 3)

Cereals - economic impact, origin and distribution, types, morphological characteristics, climate and soil requirements, cultural practices such as seedbed preparations, seeding rate, plant nutrition. Pest weed and disease control. Reference crops include sorghum, millet, maize, rice and wheat. Legumes and oil crops as on cereals and reference crops to include cowpeas, groundnuts, beans, jugobean, soyabeans, sunflower, rapeseed, cottonseed. Practical will demonstrate the above principles.

Practical

Cereals - types, morphological characteristics, cultural

practices such as seedbed preparation, seedling rate, plant nutrition. Pest weed and disease control. Reference crops include sorghum, millet, maize, rice and wheat. Legumes and oil crops as above including methods of inoculation, types of inocula and reference crops are:- cowpeas, groundnuts, beans jugobeans, soyabeans, sunflower, rapeseed, cottonseed.

APPENDIX 2

MODEL CURRICULUM FOR THE CERTIFICATE IN AGRICULTURE

AT

BOTSWANA AGRICULTURAL COLLEGE

APPENDIX 2 b

Aims of the Certificate Programme

The aim of the Certificate Course is to provide a 2-year practical and theoretical training in agriculture to nationals; to enable the trainees to acquire the essential practical skills needed by Agricultural Demonstrators or Technical Assistants and to demonstrate the subject matter which is taught in the classroom. At the end of training the students will have a sound knowledge of the principles of agriculture to enable him/her to successfully:

1. Work in rural areas as extension officers to extend agricultural information and advise farmers on farming skills.

2. Work with various specialists in the Ministry of Agriculture as Technical Assistants

3. Work in agricultural related enterprise in the private sector.

4. Own and operate a farming enterprise

5. Continue to learn and acquire additional skills after completion of the course, in the career he/she chooses.

CERTIFCATE IN AGRICULTURE
COURSE TITLES AND TEACHING SCHEDULE
YEAR 1
Semester I (16 weeks)

COURSE NUMBER	COURSE TITLE	TOTAL CONTACT HOURS	CONTACT HOURS PER WEEK	
			THEORY	PRACTICAL
ASP0010	Animal Husbandry	30	0	2
BS0011	Biology	75	3	2
BS0012	Chemistry	60	2	2
BS0013	Genetics	15	1	0
AEE0014	Communication Skills	30	2	0
BS0010	Mathematics	60	4	0
ASP0010	Anatomy and Physiology	60	2	2
CSP0010	Introduction to Crop Production	60	2	2
	TOTAL	390	16	10
SEMESTER II (16 weeks)			26	
AEL0010	Farm Workshop Skills	30	0	2
AEE0011	Rural Sociology	15	1	0
CSP0011	Soils and Soil Fertility	60	2	2
AEL0012	Surveying and Land Use Planning	60	2	2
ASP0012	Animal Breeding	15	1	0
ASP0013	Animal Nutrition	60	2	2
CSP0013	Crop Protection I	60	2	2
CSP0016	Field Crop Production	90	3	3
ASP0023	Range Management	75	3	2
	TOTAL	465	16	15
			31	

* Extension Field Training (AEE0114) (14 weeks) attachment to agricultural field staff and participation in the day to day activities of the Agricultural Demonstrator during vacations at the end of each semester except semester II year 2

YEAR 2

COURSE NUMBER	COURSE TITLE	TOTAL CONTACT HOURS	CONTACT HOURS PER WEEK	
			THEORY	PRACTICAL
Semester I (16 weeks)				
AEE0012	Agricultural Extension I	45	2	1
CSP0014	Crop Improvement	15	1	0
AEE0015	Speech and Visual Aids	30	0	2
AEE0015	Agricultural Projects	30	0	2
AEL0015	Soil and Water Conservation	60	2	2
CSP0015	Crop Protection II	60	2	2
CSP0017	Horticulture	90	3	3
ASP0021	Animal Production I	105	4	3
	TOTAL	435	14	15
			29	
Semester II (16 weeks)				
AEE0011	Basic Agricultural Economics	45	1	2
AEL0013	Tractor Maintenance and Operations	45	1	2
AEE0014	Agricultural Extension II	75	1	4
AEL0014	Farm Structures and Services	45	1	2
AEE0015	Agricultural Project	30	0	2
ASP0022	Animal Production II	75	2	3
	TOTAL	315	6	15
			21	

APPENDIX 2d

EXTENSION

SUBJECT AIM:

To provide students with practical field experience and knowledge of theory and principles of Extension. At the end of the learning experience students should be able to educate farmers and help them acquire the necessary knowledge and skills; encourage them to try improved methods of production and help them find alternative solutions to the problems of agriculture.

COURSES	TOTAL HOURS Per Programme	TOTAL HOURS Per Week	
		Theory	Practical
Rural Sociology	15	1	0
Speech and Visual Aids	30	0	2
Agricultural Extension I	45	2	1
Agricultural Extension II	75	1	4
	165	4	6
Extension Field Training	(14 weeks)		

APPENDIX 2e

SUBJECT DETAILS

Subject Area: Extension

Course Title: Introduction to Agricultural Extension

Course Topics

1. Meaning of Extension
2. The need for extension
3. Extension Philosophy and Principles
4. Extension organization and administration in Botswana
5. Extension approach in Botswana
6. Teaching and learning
7. Communication
8. Extension methods
9. The role of an extension worker
10. Social and cultural factors in extension

SUBJECT AREA: Extension
COURSE TITLE: Agricultural Extension 1

COURSE NO: AEE0012
TOTAL HOURS: 45

Contact Hours/Week: Practical 1 = 15/semester
Theory 2 = 30/semester

COMPETENCE/OBJECTIVES	TOPIC AND CONTENT	TEACHING/LEARNING ACTIVITIES	TEACHING METHODS AND TECHNIQUES	PERIODS	
				THEORY	PRACTICAL
A. At the end of the course students should be able to:					
1. Explain what is meant by extension -recognize agric extension as a force towards change, explain the role of extension in promoting agric productivity	Introduction to agricultural extension (a) the meaning of extension (b) the need of extension in promoting change	Define extension, compare different definitions to help students understand the implications of the meanings, stress and explain the role of agricultural extension as a means of change from traditional to improved farming methods.	lecture, brain storming, group discussion, film show.	3	0
2. Explain what is meant by philosophy and principles of extension	Extension Philosophy and Principles	Explain what is meant by Philosophy and Principles of extension	lecture, group discussion, film show.	2	0
3. Discuss the organisation of extension in Botswana, explain the structure of the Ministry of Agriculture and levels of Management with relevance to the administration of extension; discuss the evolution of extension approaches in Botswana	The Organization and Administration of Extension in Botswana (a) the history of extension (b) the role of the Ministry of Agriculture in extension services (c) extension approaches in Botswana	Explain the role of the Ministry of Agriculture in extension services; functions of the different department. Explain the structure of the Ministry and how it influences or affects the flow of information through the extension worker to the farmer.	lecture, group discussion, excursion to the ministry and departments.	3	3
4. Explain the teaching and learning process in Adult education; state and discuss the principles of teaching adults and learning styles; explain the steps in learning	Teaching and Learning Process (a) types of learning (b) teaching adults (c) how adults learn (d) factor affecting learning and steps in learning	Explain in detail the learning process; the theories that go with it and discuss techniques for teaching adults. Describe how adults learn and outline the factors affecting learning. Clarify the relevance of Adult education to extension education.	lecture, group discussion, brain storming, exercise case study, film show.	6	2

5. Explain the meaning of extension; discuss the role of communication in extension; explain the methods and characteristics of communication.	Communication -methods - characteristics	Explain the meaning of communication. Clarify its role in extension education; describe the characteristics of communication, methods.	brain storming, group discussion, lecture, Games, film show.	2	1
6. Discuss and describe the different teaching methods in extension; select the most effective and appropriate methods depending on the situation; plan and demonstrate method.	Extension Methods - individual - group methods - mass contact methods - audio-visual aids in extension	Describe the different extension methods; explain how to plan and organize for a particular extension teaching method. Discuss individual methods, the different techniques used in the method such as farm visits. Discuss the group and mass contact methods, their techniques. Explain criteria for choosing a particular method. List and classify audio-visual aids. Explain their advantages.	lecture, role playing, group discussion, group exercises, film show, excursion to the Ministry and the department of agricultural information.	6	9
7. Describe division within the farming society in Botswana; explain the existing culture. customs and traditions; discuss the process of change, barriers and factors promoting change.	Social and Cultural Factors - customs and traditions - change barriers and factors promoting change	Explain the role of rural sociology in agricultural extension; discuss the characteristics of the rural community in Botswana, cultures, customs and traditions.	lecture, group discussion.	4	0
8. Explain the meaning of change agent; explain the role of the extension worker as a change agent; outline the qualities of an effective extension worker; state and discuss the duties of the extension worker	The role of the extension worker as a change agent - qualities of an effective extension worker - duties of the extension worker	Explain and stress the role of the extension worker as a change agent. Outline the qualities of an effective extension worker and list the duties.	brain storming, group discussion, lecture.	4	0
			Total Hours	30	15

NOTE: A complete curriculum would have description of content and teaching strategies for all subjects offered in the two-year programme.

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