

**AN INVESTIGATION INTO THE IMPLEMENTATION OF THE
SENIOR SECONDARY AGRICULTURE CURRICULUM
IN THE CAPRIVI REGION OF NAMIBIA**

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ABSTRACT

Shortly after independence, Namibia embarked on a major process of educational reform. It was in this reform that the apartheid educational legacy was redressed. Namibians viewed the apartheid educational system as being irrelevant and that it did not meet their needs and expectations. One of the reform aims was to involve education in the development of knowledge and skills for self sufficiency and sustainable development, therefore Agriculture was incorporated into the school curriculum as a key area to achieve this aim. Learners taking the subject are expected to be equipped with relevant theoretical and practical skills that provide a sound foundation in this discipline.

This case study was undertaken to gain a better understanding about how the participating teachers perceived and implemented the Agriculture curriculum at the senior secondary school level in their schools. In carrying out the case study a qualitative research method was employed using semi-structured interviews, observation and document analysis for data collection.

It would appear from this study that Agriculture is unable to fully achieve the reform ideals at the senior secondary school level, as sixteen years after independence these teachers are still teaching the subject to learners with very limited resources and academic support. This scenario shows that there are marked inconsistencies between policy and praxis, between the stated goals and aims of the reform and the curriculum designed to achieve these. In this half-thesis I therefore argue that without well qualified teachers, suitable resources and infrastructure to implement the curriculum in these schools, the pre-vocational nature of the subject as suggested in the subject policy document will be compromised.

The study concludes by proposing certain teaching strategies and possibilities for systemic development that can be used to effect quality curriculum implementation in the region where the research was situated.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

Namibia continues to depend heavily on agriculture in spite of being one of the most arid areas in southern Africa. The harshness of the climate requires that agricultural practices need to be particularly sensitive to the fragile environment. This study focuses on the role of education in the senior secondary phase mindful of the importance of ensuring a sustainable future for agriculture in Namibia.

This chapter gives a brief overview of what prompted me to conduct this study and what I hoped to achieve, and provides the context of the study. In addition the chapter gives a brief outline of the structure of the dissertation.

1.2 Background

Different farming systems are practised in different parts of Namibia depending on the climatic and rainfall conditions as well as the soil types in which an area happens to be located. This disparity in soil type, rainfall and climatic conditions not only dictates the type of farming a particular area or region but imposes particular parameters on agriculture.

1.2.1 Research site

This study was conducted in one of the 13 administrative regions of Namibia. Namibia, a semi-arid country, covers an area of 824 116 square kilometres in Southern Africa. The country is bordered by Angola in the north, Zambia in the north-east, Botswana to the east and South Africa in the south.

The only perennial rivers of Namibia are those that form the borders between Namibia and its neighbours. The Kavango River divides Namibia and Angola, the Zambezi River divides Namibia and Zambia, and finally the Orange River divides

Namibia and South Africa. The south-east of Namibia has a coastline of 1 572 km, bordered by the Atlantic Ocean.

My study was conducted in the north-eastern region of Namibia. This is the region of the country that receives more rain than the rest of the country (approximately 740.7 mm per annum). This region is known as the Caprivi Region, with the regional town of Katima Mulilo being the largest of the urban settlements. Katima Mulilo is on the banks of the Zambezi River.

Caprivi Region is a corridor from Namibia to three countries, namely Botswana in the east, Zimbabwe in the north-east and Zambia in the west (see Appendix 1). This region is connected to the rest of the country by the Trans Kalahari-Caprivi highway.

Agriculture is the main source of livelihood in the region. People here farm with livestock such as goats, sheep, pigs, and cattle. Apart from livestock farming they also engage in crop production and they grow crops such as maize, millet, beans, and vegetables. However, the majority of farming is on a subsistence level.

1.3 Context of the study

This study is mindful of the context in which agriculture is practiced and located in Agricultural education at the senior secondary phase of formal schooling and it seeks to illuminate how the selected teachers respond to the teaching and learning of Agriculture. Considering how important agriculture is to the rest of Namibia and to this region in particular, I therefore decided to embark on this case study in order to establish how the Agriculture curriculum is implemented by three teachers in two selected senior secondary schools within the Caprivi Region.

Muyunda (2001) and Mashebe (2005), emphasise Agriculture's importance especially to developing economies because it provides employment, income, food, raw materials and foreign exchange to the nation. According to Owen (1984:1), agriculture also points the way to improving food production and it offers a practical solution to many development problems. Owen (1984:1) suggests that "a study of agriculture can help to lay the foundations upon which to build all other aspects of national development".

Agriculture in the Namibian Education system is taught at upper primary, junior secondary and senior secondary school levels. The senior secondary education provides learning opportunities to equip learners with the necessary agricultural knowledge, skills and attitudes to enter tertiary studies or the world of work (Namibia. Ministry of Basic Education and Culture [MBEC], 1998:7).

Agriculture at upper primary school level is taught as 'Elementary Agriculture' whilst at junior and senior secondary school levels it is taught as 'Agriculture'. According to the Namibian Education Policy, agriculture is regarded as a pre-vocational subject because it puts emphasis on preparing learners for both higher education and the world of work (Namibia. Ministry of Education and Culture [MEC], 1993; Namibia. MBEC, 1998).

This means that agriculture as a pre-vocational subject should emphasise practical work as an integral part of the course (Namibia. MBEC, 1998:2). Agriculture as a pre-vocational subject is furthermore part of the policy to ensure the all-round development of learners, which will equip them for life (Namibia. Ministry of Basic Education Sport and Culture [MBESC], 2001:5). Given the reliance on agriculture by the majority of Namibians, teaching and learning in this area would appear to have particular relevance.

Agriculture is, however, also regarded as an applied biological science because it cuts across the natural sciences such as chemistry, physics and mathematics (Dejardin et al., 1991; Mujuni, 1998; Van Harmelen, 2004; Namibia. MoE, 2005). Agriculture also requires knowledge of business economics and accountancy. Muyunda (2001:64) supports this idea, when he stated in his research that many people view agricultural education as a business enterprise.

Schools in Namibia offering Agriculture need to place an emphasis on quality and effective teaching and learning of Agriculture. The Broad Curriculum (Namibia. MBEC, 1998:2) suggests that "teachers are encouraged in order to link theory and practice, to use a practical approach in teaching the subject", and that "learners learn best when they are actively involved in the learning process through a high degree of participation, contribution and production" (Namibia. MBEC, 1998:9). Theory, however, can only be put into practice if schools have enough tools and equipment,

well-equipped laboratories for conducting experiments, agricultural machinery, farm structures, livestock and/or crop farms (Akinsanmi, 1975; Schekman, 1984).

Current trends in agriculture call for learners to be exposed to scientific and mathematical subjects. Since our learners are being prepared for agricultural tertiary institutions and the world of work, they have to have passes in Mathematics, English and any two of the science subjects such as Agricultural Science, Physical Science and Biology (University of Namibia, Ogonjo Agricultural College, Neudam Agricultural College & the Polytechnic of Namibia, Prospectus for 2005).

Having been an agricultural extension worker, teacher, lecturer and now an advisory teacher, I realised that many agricultural students at both school and teacher education colleges do not meet the entry requirements to further their studies at tertiary institutions that offer agriculture as a field of specialisation. Muyunda (2001) claimed that most of the teachers who graduate from colleges of education are not well equipped to teach certain topics in the agricultural school syllabi.

The findings from the two junior secondary schools emanating from the research conducted by Muyunda in 2001 in the Caprivi Region revealed a number of shortcomings. The findings revealed that the majority of the teachers who taught Agriculture in these two schools were found to lack the required professional teaching qualifications in this field, and some who claimed to have received an agricultural training had done so through correspondence (Muyunda, 2001:8). Such teachers, he suggests, will be lacking key practical skills to adequately educate learners.

In my experience 50% of the student teachers at our colleges of education are admitted into this field with only one science subject and are without mathematics. Such student teachers are educated to teach Agriculture at junior secondary school level. As for those who are to teach Agriculture at upper primary school level, some of them are admitted into the programme without mathematics or any of the science subjects.

Muyunda's findings also revealed that the selected schools lacked agricultural resources, tools and equipment. In addition they also lack the necessary agricultural infrastructure which learners need for practice. As a result the focus is more on theory than practice (Kamwi, 2005).

Since little research has been conducted in the current teaching and learning of Agriculture in schools, I felt that I needed to embark on this research. Muyunda's research focused only on the junior secondary school phase and then in only two schools. I therefore felt that in order to understand better how Agriculture is taught and learnt in schools, one has to consider all the three phases in all the 44 schools that offer Agriculture as a subject in the Caprivi Region. However, my research being a small-scale study will only focus on the senior secondary school phase with regard to the current status of teaching and learning of Agriculture in the Caprivi Region.

In embarking on this study, I hoped to illuminate the current situation through the in-depth analysis of my case study such that my own practice will benefit from a better understanding of the situation. Further to this I hoped not only to examine my case study in the light of existing research but also to provide further insights into the teaching and learning of agriculture.

The aim of this research is therefore to investigate selected teachers' perceptions of the nature and role of Agricultural Education and how they implement it at the Senior Secondary Phase of formal schooling.

1.4 A brief overview of the study

This part of the chapter gives a summary of each of the chapters contained in this dissertation.

Chapter 1 gives an introduction of all the components of the whole mini-thesis by providing a brief overview of each chapter. It does so by describing the context of the research and the research goals. The chapter further introduces to the reader my role as an educator and what prompted me to undertake this case study.

Literature that was important in helping to inform this study has been reviewed in Chapter 2. A central focus is on how Agriculture came to be introduced in the Namibian educational curriculum as a pre-vocational subject during the introduction of the educational reform shortly after independence, and on ways of implementing the subject in senior secondary schools in the context of the learner-centred paradigm shift.

Chapter 3 presents and describes my research design as well as the methodology I used to gather data for the study. It further describes the orientation in which I chose to situate and understand my study. The research techniques and how I applied them during data gathering are described and justified.

Chapter 4 presents the data that I collected from semi-structured interviews, observations and document analysis. This data emerged from the first layer of my data analysis.

Chapter 5 presents a discussion on the emerging issues, which arose from a reflection of my research questions and the data analysis in Chapter 4. The teachers' views on the strategies of implementing Agriculture as a pre-vocational subject at senior secondary school level, the type of resources they use and how they use them are discussed in line with the recommendations of the Agriculture subject policy document.

Chapter 6 presents the conclusions and a critical reflection of the research process and findings. The lessons learned are considered, as are the limitations of the study.

1.5 Conclusion

This chapter provided an outline of the context and objectives of the research. Further to this an overview of different chapters of the research report was provided. The chapter that follows focuses on policy and other contextual issues that are relevant to the study. The latest research findings that are relevant to the research topic are also reviewed and presented in the chapter.

CHAPTER 2

LITERATURE REVIEW

The approach in teaching Agriculture as a science subject should therefore be aligned to the country's major development plan of vision 2030 with the aim of promoting development efforts for the industrialized nation.

(Muyunda, 2006:2)

2.1. Introduction

As stated in the previous chapter, the overall goal of this research is to explore the teaching of Agriculture in the senior grades of the high schools. In doing so I investigate how this curriculum is implemented in the light of the guidelines of the Namibian educational reform policy, as prescribed in the Agriculture subject policy document for senior secondary schools.

This chapter starts by giving an overview of what Agriculture is, as a discipline and as a subject in schools. This discussion will be followed by a brief historical overview of how and why agriculture has developed in an educational context.

Since the Namibian Educational System operates within the parameters of an Educational Policy, this chapter also will focus on how the Namibian Education Policy incorporates agriculture as one of the pre-vocational subjects. This will lead on to an assessment of teaching and learning of pre-vocational subjects with particular reference to Agriculture. At this stage I will focus on the core of my research, which looks at the objective of including Agriculture in the school curriculum.

This chapter also focuses on an argument which asserts that, if Agriculture is to have a chance of achieving its objectives, teachers presenting it should be competent in both content and pedagogy to effectively implement it, both in and outside the classroom. Teaching and learning in Agriculture should culminate in the learners having a deeper conceptual understanding of the skills they are expected to acquire. This is an additional focus of my research. The argument further provides a discussion

on the role played by the agricultural infrastructure and resources and how they assist teachers and learners to teach and learn the subject respectively.

This chapter also includes a discussion of previous investigations conducted on the topic under investigation and the influence of those findings on my research.

2.2. Agriculture as a discipline and a subject

Agriculture is a multifaceted and applied science including areas ranging from seed production, crop production, food processing, animal production, marketing, pest control, water supply, transport, and farm management, to building and machinery maintenance (Owen, 1984). According to Henry (in Schekman, 1984), Agriculture can be divided into five domains, namely: Agronomy, Horticulture, Animal Husbandry, Agricultural Engineering and Agricultural Economics. Mujuni (1998) refers to Agriculture as having these branches: Agronomy, Animal Husbandry, Agricultural Engineering, Agricultural Economics, Forestry, Horticulture and Soil Science.

This being the case, learners taking this subject must be well prepared in all these agricultural aspects in order for them to be regarded as being competent in the entire discipline. This many faceted field of knowledge has considerable implications for teachers if all the listed aspects constituting 'Agriculture' are to result in learners having a deep conceptual understanding of the subject (Etchberger & Shaw, 1992) It therefore calls for teachers who are well equipped in both the subject and pedagogic knowledge (Prawat, 1991). The Namibian Agriculture subject policy document echoes Prawat's emphasis regarding the competence of teachers, stating "The effective teaching of Agriculture requires well qualified teachers in the field of Agricultural education or teachers who have received adequate in-service training in the subject" (Namibia. Ministry of Education [MoE], 2005:1). Further to this Namibia MoE (2005:1) states "An additional requirement for teaching Agriculture includes commitment, dedication and hard work as the subject may at times require hard labour from teachers and learners".

Schools also should be well equipped with appropriate teaching and learning resources. Since the teaching and learning of Agriculture requires both theoretical and practical knowledge, schools which offer the subject should have adequate land,

agricultural infrastructure, tools, equipment, apparatus, laboratories and farm machinery on which learners can put the theoretical knowledge learnt in a classroom into practice (Owen, 1984; Namibia. Ministry of Education and Culture [MEC], 1993; BETD Broad Curriculum, 1998). Namibia MoE (2005:3) adds, "Agriculture is one of the subjects which can be taught in both a practical and theoretical way and therefore requires enough and essential teaching/learning materials for successful implementation".

The Namibian policy (MoE, 2005:10) further suggests:

In situations where there are enough resources and facilities, it is recommended that provision must be made for special classrooms for teaching Agriculture as a subject at a particular school. This will provide an atmosphere appropriate to the subject by creating a classroom stocked with pictures, specimens, unfinished experiments etc.

Agriculture, if well taught by teachers in schools, will help learners develop positive attitudes, knowledge, values and skills towards the subject (Namibia. MEC, 1993; BETD Broad Curriculum, 1998). The aim of incorporating this subject into the Namibian curriculum is to prepare learners for their future livelihood. This means that learners should not only be prepared for the world of work and to be self-reliant in food production but should also be prepared for tertiary institutions which offer a course in this field (Namibia. MBEC, 1998; Namibia. MoE, 2005). This means when learners choose to become farmers, after the completion of their senior secondary school and tertiary education, they may be equipped with some skills and efficient ways of cultivating the land, means of protecting their crops against pests and diseases, and experimenting with different varieties of plants and animals (Akinsanmi, 1975:2).

According to Owen (1984:1) "Agriculture is an essential activity because through the production of crops and livestock people obtain their food". By so doing there will be an alleviation of malnutrition, poverty and unemployment from the communities they come from. Owen, (1984:1) suggests: "The more food a village or a country can produce for itself, the less dependent it is on production by others". In addition Mujuni, (1998:1) states "Agriculture is a source of food, income, employment, foreign exchange, raw materials, livestock feed, draught power, animal manure and a market for manufactured goods".

So far I have considered the benefits and the importance of studying this subject, as well as touching on the practical skills considered to be useful in this subject. If our learners are equipped with appropriate methods of food production, which involve the use of appropriate technology, they may produce agricultural products on a larger scale, which will help Namibia earn foreign exchange for her people. Owen (1984:1) has emphasised the relationship between food security and a healthy agricultural sector and development, saying "If some of the produce is exported to other countries, the money obtained can be used to improve conditions at home, such as building new roads, hospitals and schools".

According to Johnson & Deeds (n.d.), traditionally, an agricultural education curriculum was designed to be both practical and applicable for students who were returning to the farm, concentrating on the "how" of implementing agricultural knowledge in the 21st century. Agricultural production is making some improvements on the traditional methods of food production by adding value to agricultural products, which have to be produced on a larger scale.

To do this scientific methods have to be employed, these rely on scientific skills, which in turn have to be acquired from a classroom situation (Warnic & Thompson, in National Research Council, 1988). According to Johnson & Deeds (National Research Council, 1988), integrating science into agriculture would not only strengthen agricultural curricula, but also more effectively teach science. Once again the teacher and the learner have to be involved.

Teachers have to teach their learners scientific skills, particularly those associated with experimentation, including researching, analysing, interpreting and synthesising data (Peacock, 1986; Namibia. MEC, 1993; Namibia. MEC, 1995; Turner & Di Marco, 1998). All these skills have first to be taught in a classroom and later applied in a real life situation. The reason given by Woolnough (1991:13) is: "Practical work has gradually acquired an increasing prominent place in the school science curriculum". This is what makes Agriculture an applied science: it uses methods of science and applies them to food production (Elliot et al., 1991). Above all, agriculture uses many natural resources and modern scientific, agricultural chemical inputs for food production as "science has a lot to say about how plants and animals function, how machines work, and how we can control our environment" (Elliot et al., 1991:2). In support of the other authors, Kay (1996:8) further states, "Farming is an applied

science because farmers make use of scientific knowledge and experience to get the best from their environment and natural resources". He further contends, "Because agriculture is an applied science, farming knowledge and practice is always changing and developing" (Kay, *ibid.*).

Having looked at what Agriculture is as a 'subject' and as a discipline, it is important to provide a historical overview of how and why it has developed in the educational context of Namibia.

2.3. A brief historical overview of Agriculture in an educational context

In this section I will consider how Agriculture came to be part of the formal school and tertiary curriculum. I will trace the development of Agriculture as a pre-vocational subject, thus giving insights into the rise of pre-vocational subjects in the Namibian curriculum.

Mankind's basic needs are food, clothing and shelter. Pre- and non-agricultural societies rely on hunting and gathering (Akinsanmi, 1975; Owen, 1984; Elliot et al., 1991). Even today in Namibia food production ranges from pastoralism and settled agriculture to hunting and gathering (Amukugo, 1995:35).

Agriculture since time immemorial has played a major role in the economic and social support of human life and this is a justification for the claim that agriculture is the backbone of a country's economic system (Akinsanmi, 1975; Henry in Schekman, 1984; Owen, 1984; Elliot et al., 1991; Mujuni, 1998). However agriculture is not a static field of knowledge as methods of practising agriculture continue to change according to the changes in the world of technology which are dictated by time, climatic variations and the advancement of agricultural education research and implementation (Johnson & Deeds, n.d.; Van Harmelen, 2003).

Referring to Africa (Owen, 1984:3) stated that: "As Africa began to be developed, ploughs and other machines began to be used". This meant the introduction of new methods, breeds of livestock and crop cultivars needed to be taught to the farmers who were to use them in order to produce food on a large scale. Considering the fact that in our schools we don't only prepare our learners for tertiary institutions or the world of work, but also prepare them to be farmers, it is therefore important to include

agriculture in the school curriculum (Namibia. MEC, 1993; Muyunda, 2006). According to Kay (1996:8), "Farming is a business because, whether you are farming for subsistence or farming for profit, you want to obtain maximum yields for minimum cost".

Before I look at the incorporation of Agriculture into the modern Namibian Education System, I will draw on the colonial education system's aims and objectives for introducing Agriculture into the school curriculum.

Missionaries, as the first advocates of formal education in the curriculum, made sure adolescents and adults were taught the art of gardening, building houses, making roads and the use of hand tools; these skills learned were used in the service of missionaries and settlers (Amukugo, 1995:43). This type of education for black people in Namibia was perpetuated by the successors of first missionaries, the Germans, British and the Afrikaners (Cohen, 1994; Amukugo, 1995).

The aim and objective of the current Namibian Education System is to improve on the shortcomings of the Colonial Educational System. In contrast to how Agriculture was practiced in the previous system, the current Namibian Education System takes learners further to Senior Secondary School grades of 11-12 and it prepares them holistically in terms of the world of work, entry to tertiary institutions as well as emphasising self-reliance in the absence of public service employment (Namibia. MEC, 1993; Namibia. MBEC, 1998).

Current national policy states: "The National Curriculum Guidelines, applicable at the stage of senior secondary education (Grades 11 and 12) and at equivalent stages of non-formal education, as a part of life-long learning, recognize the uniqueness of the learner and adhere to the philosophy of learner-centred education" (Namibia. MoE, 2005:1). It is in this paradigm that "The teaching of Agriculture has since independence shifted from transmission of facts or information to teaching learners how to learn and how to find information themselves" (Namibia. MoE, 2005:5).

Following the principles laid down in the Namibian Educational Policy Document 'Toward Educational for All' regarding the most appropriate education system for all Namibians, an appropriate Educational Curriculum for the country was introduced and is being implemented in Namibian schools.

2.4. The Namibian Education Policy on Agriculture

The Namibian Education Policy categorises Agriculture as a pre-vocational subject in the national education curriculum for both schools and tertiary institutions because it combines both theory and practice in its curriculum implementation (Namibia. MEC, 1993). The Namibia. MoE (2005:1) states:

The Agriculture subject policy guide should therefore be viewed as specific guidelines which should be used in conjunction with other ministerial policy governing the subject Agriculture to enhance better understanding. This policy guideline should however, not be considered as a prescriptive document but should be used as a negotiated directive for both the advisory teachers, school management, teachers and learners to make it easy to offer the subject with success.

The Broad Curriculum (Namibia. MBEC, 1998:2) suggests, “teachers are encouraged in order to link theory and practice, to use a practical approach in teaching the subject” and that “learners learn best when they are actively involved in the learning process through a high degree of participation, contribution and production” (Namibia. MBEC, 1998:9).

Further to this, in order to put the theoretical knowledge into practice there must be adequate time allocation for this subject on the school timetable. According to the Agriculture subject policy document guidelines, “Agriculture is a subject that requires a lot of practical work and will therefore need to have double periods on the school timetable to provide enough time for practical activities both inside and outside the classroom situation” (Namibia. MoE, 2005:2).

Theory, however, can only be put into practice if schools have enough tools and equipment, well-equipped laboratories for conducting experiments, agricultural machinery, farm structures, livestock and crop farms (Akinsanmi, 1975; Schekman, 1984). In complementing the idea raised by these authors, the Namibia. MoE (2005:3) stated, “The school offering Agriculture should be in possession of lists of textbooks, teaching aids and tools and equipment which assist in effective implementation of the subject”. In trying to justify the importance of using teaching aids in a learning and teaching situation, Namibia MoE (2005:4) stated, “Teaching aids amplify learners’ interest and understanding of the subject, as they help in retention of the material by fixing an image in the mind of the learners”.

It is important to adapt the pre-vocational curriculum to the local setting (Namibia. MEC, 1993; Van Harmelen, 2004). According to Namibian Policy (MEC, 1993:92), the major aim of pre-vocational education is to provide all learners with an appreciation of the skills and attitudes appropriate to work settings. Mannel (1995:134) suggests that the purpose of pre-vocational education is to create an opportunity for a learner to acquire basic skills, abilities and knowledge in one or more technological or pre-vocational subjects.

According to Engelbrecht (2002:26), “pre-vocational education embraces those aspects of formal and informal education which develop in all young people the generic skills, values and attitudes they will need to cope effectively with the demands of further education, training and adult life in a rapidly changing world”.

The policy emphasises that “Their pre-vocational preparation will be even stronger if it enables learners to become skilled at identifying and solving problems, analyzing situations and drawing on their knowledge to synthesize solutions, and applying what they know to new settings” (Namibia. MEC, 1993:88). Mannel further stated that those with the background of pre-vocational education have a better chance of survival in the ever-decreasing employment market (1995:134).

According to Brunette (2002:175) Namibians do not know how to use ‘correct’ farming methods, as we have to import most of our food, especially from South Africa. By using ‘correct farming methods’, Brunette refers to the use of natural resources and organic matter that come from animal and plant remains or by-products in order to gain some returns on the type of farming system used. Brunette (2002:176) continues:

Agricultural education will definitely introduce learners to modern farming techniques and equipment. Students could learn how to use the natural resources optimally and effectively in order to produce meat and crops for own use and export.

This is seen as sufficient justification to educate learners in practical agriculture, hence the importance of including this subject in the educational curriculum. Furthermore Brunette (2002) argues that despite the fact that agriculture is considered as the backbone of the Namibian economy and is the sector which provides the

biggest number of jobs to Namibians, it seems as if it does not receive enough support for development.

Agriculture is taken by learners who live in both rural and urban areas, so the curriculum of these learners should incorporate all their different home background experiences and all the learning and teaching of this subject should be contextualised to the local environment. The curriculum should also consider the economic status and the diversity of the Namibian climatic and soil conditions. The teaching and learning objectives in the curriculum of this subject should aim at equipping the learners with both theoretical and practical knowledge by using the resources that surround them (Namibia. MoE, 2005).

This means that the curriculum for learners who live in rural areas should be developed in such a way that it exposes them to growing crops or keeping livestock on a larger scale due to the availability of land. It should also expose them to the methods of recycling plant and livestock remains for profitable crop and livestock production (City Farmer, 1995; Opperman & Stiglingh, 1996).

The curriculum for schools that are in arid and rain-fed areas should also be designed to address the learning needs of the learners by introducing them to the attainable methods of producing agricultural products under these conditions.

Urban agriculture, as already stated, can also be learnt through the subject Agriculture. Urban agriculture can be defined as the growing of food and non-food plant and tree crops and the raising of livestock both within and on the fringe of urban areas (Ganapathy, 1983; Ford Foundation 1993, Siau & Yurjevic, 1993 in Opperman & Stiglingh, 1996). It is also an activity that can make a positive contribution to living conditions at a local level (Van der Stoep, 1994:27).

The reason for including urban agriculture in the curriculum is to try and meet the needs of children who may want to study Agriculture in these areas. It is also a way of assisting children who come from poor families and whose parents have no source of income or are getting inadequate income to support them and live healthily (Schmidt, 1995 & Niland in Opperman & Stiglingh, 1996).

In future the skills gained from such a curriculum can help the learners in their adult lives to cut down their expenditure on foodstuffs by growing their own crops and rearing livestock on the limited natural resources available in these areas (Mutiso, 1993).

Drawing on the ideas of Julius Nyerere, the former President of Tanzania, regarding the importance he and his government attached to agriculture and education, we learn that he introduced in his country a policy of "Ujamaa" which puts the citizens of Tanzania together by providing better for themselves and providing more farming tools such as tractors (Katzao et al., 1993).

2.5 Translation of policy into curriculum

The Life Science syllabus at junior secondary level introduces the elements of agriculture and applied science more generally (Namibia. MEC, 1993:92). At this stage basic practical skills are to be mastered in their contexts, for example textiles, woodwork, metal work, and small-scale agriculture, animal rearing, and commerce (Namibia. MEC, 1993:92). This is why it is important to teach Life Science along with Agriculture. In addition, "The subject Life Science combines aspects from the fields of agriculture, biology, ecology and health education" (Nott, 1994:1).

Agriculture as a subject taught in schools, especially at senior secondary school level, should aim at equipping learners with knowledge, skills and attitudes to conserve our natural resources and address issues of social and economic justice such as freedom from hunger and disease (Namibia. MoE, 2005:2). This is consistent with the Agriculture Rationale which is clearly stated in the Agriculture syllabus for Senior Secondary Schools – a policy document in its own right:

The main focus of the Agriculture syllabus for Senior Secondary is to develop a critical understanding of the interrelationship between science and technology, society and environment. It must be understood that agriculture is one way of managing our natural resources. The execution of all agricultural activities must therefore be based on the principle of sustainable agricultural environment. This should be done with the aim of conserving our natural resources in order to address issues of social and economic justice such as freedom from hunger and diseases.

(Murray, 2005:37)

2.6. Teaching and learning of Agriculture at Senior Secondary School Level

In the past, the knowledge of Agriculture did not demand sophisticated technical expertise; this is not the case in the present day Namibian education system. Teaching in the past was teacher-led; it did not focus on the individual needs or overall development of a learner. Attention and activities were focused on the teacher with little attention paid to learners, their background and interests (Namibia. MEC, 1993). According to Nott (1998:8), “The teacher should encourage learners to take part in discussions, experiments, group activities and practical work”. During the learning and teaching sessions Nott (ibid.) further states that “Instead of the lesson revolving only around what the teacher says and does, it should also revolve around the learners and their activities”.

Currently education provides learning opportunities which equip learners with the necessary agricultural knowledge, skills and attitudes to enter tertiary studies or the world of work (Namibia. MBEC, 1998:7). Despite this, policy and curriculum development studies related to the teaching of Agriculture in Namibia have shown the following: first, teachers in most of the Namibian schools offering Agriculture are not trained in the subject, and if they are appropriately trained they may be required to teach the subject at a grade level they are not trained for (NIED, 2003). According to NIED (2003:28) teachers claim “they are put to teach subjects or in a phase for which they have not been prepared to teach, or they have not had sufficient professional modeling to follow”.

Second, a study undertaken by the Namibian government (MEC, 1993) reveals that at times teachers who have been professionally prepared to teach the subject might be reluctant to switch over to the new paradigm, which is learner-centred, simply because they are not comfortable with it and would rather cling to their traditional methods of teaching (Namibia. MEC, 1993).

This study also noted “teachers are familiar with the term ‘learner-centred’, but tend to understand it rather superficially in terms of classroom methodology such as group work” (NIED, 2003:27).

As we make the transition from educating an elite to education for all we are also making another shift, from teacher-centred to learner-centred education... What teachers do be guided both by their knowledge of the concepts and skills to be mastered and by the experiences, interests, and learning strategies of their students. Our challenge is to harness the curiosity of learners and the excitement of learning rather than stifling them.

(Namibia. MEC, 1993:10)

The paragraphs which follow expand these ideas to include an active role for the learner through interaction with the teacher, the investigation of problems and materials in the local environment, and cooperative learning (Grannis, 1998:39).

The concept of learner-centred education dictates that all learning should be meant for an individual learner who has to be assisted by his or her fellow learners, teachers, the community and the learning support materials which use a variety of challenging teaching strategies and activities so as to enable him or her to achieve his or her fullest learning potential (Namibia. MEC, 1993).

According to NIED (2003:30) "the approach of learner-centered education is to develop each learner's ability to construct his or her own understanding; the question of the autonomy of the learner comes into focus". In trying to make the term 'autonomy' clear to both learners and teachers NIED (2003:30) states "learner autonomy implies the ability to think and act independently and considerately, on an informed basis". In addition NIED (2003:30) states "growing to autonomy depends very much on the development of intrapersonal, social and emotional intelligences, both in the teacher and the learners".

Resources play a prominent role in the implementation of learner-centred education in our schools. The problem underlying the concept 'resources' is that it has often been confused by teachers and learners alike to mean the use of sophisticated teaching and learning materials, apparatus and equipment without including themselves in this educational package. A learner-centred approach recognises the importance of human resources for teaching and learning (NIED, 2003).

Teachers who are well equipped with the principles and the requirements of learner-centred education ought also to be seen as resourceful. "The knowledge and experience of the community, the learners themselves and the teachers are recognized and used as learning resources" (NIED, 2003:32).

Therefore, for an Agriculture and Life Science teacher, resources can also mean inviting experts into his or her classroom during lesson time; these experts may come from the Department of Agriculture, non-governmental organisations or parastatals which deal with agriculture and may include agricultural engineers, veterinary officers, agricultural extension officers, communal and commercial farmers. These professionals can give the required first-hand information on any given agricultural topic.

A school professing to be learner-centred in which Agriculture is being taught will provide a conducive learning and teaching environment with the ultimate aim of providing a positive response to both the hidden and intended curriculum. “Any discrepancy between the intended and hidden curriculum weakens the learner’s trust and confidence in the intended curriculum and the school as a learning organization” (NIED, 2003:33).

A conducive teaching and learning environment treats learners, teachers and managers of the school as partners in education; none of these is supposed to look down upon the other, as NIED emphasised: “A learner-centred school will be democratic in its ethos and organization culture” (2003:33).

Teaching and learning of Agriculture at senior secondary school level is demanding on the part of learners and teachers. The Agriculture curriculum at senior secondary school level not only requires theory and practice in implementation, but it also requires learning and teaching activities that are challenging to both learners and teachers (Namibia. MEC, 1993).

Agriculture being a pre-vocational subject has to be implemented in schools under the following pre-vocational curriculum objectives as outlined in Toward Education For All. It should:

- develop responsible decision making, problem solving, and study skills in relation to the world of work;
- develop attitudes toward work settings that are consistent with good citizenship; and

- enable all learners to be effective, enterprising, and capable in both further study and work settings through active learning methods and relevant practical experiences.

(Namibia. MEC, 1993:92)

Teaching and learning of Agriculture is a full package, which involves teaching and learning methods, both inside and outside classroom practices, assessment and examinations. According to Swarts (1995:12) “learners experience a mode of delivery where they are encouraged to participate actively, where all are expected to be involved, and where they are regularly assessed”.

Agriculture could be learnt and taught in various ways such as presentations, demonstrations, project work, garden practicals, outdoor practicals, classroom practicals, and field trips (BETD Agriculture and Life Science Syllabus, 1997). The entire package should be targeted at a learner who should be the recipient and beneficiary of the package. Learners should be allowed to develop process skills which help them to better understand where the facts and concepts of science come from (NIED, 1995:3).

This being the case I conclude that a deeper conceptual understanding can only take place where an appropriate pedagogic approach is adopted. An appropriate pedagogic approach is the one which uses the current methods of teaching and learning backed up with the appropriate teaching and learning resources which learners can practically use to construct meaning through their thinking skills (NIED, 1995).

Furthermore, the recommended current pedagogic approaches in the teaching and learning of Agriculture should aim at developing in the learner scientific attitudes such as accuracy, integrity, inquiry and inventiveness (BETD Agriculture and Life Science Syllabus, 1997). In addition they should seek to develop scientific skills in learners, such as problem identification, experimentation, observation, gathering of data and drawing of conclusions (Namibia. MEC, 1993).

Since Agriculture, according to the Namibian Education Policy, is regarded as a pre-vocational subject, it has to put emphasis on the preparation of learners for both higher education and the world of work (Namibia. MEC, 1993; Namibia. MBEC, 1998).

2.6.1. Challenges faced by Agriculture in schools based on previous reports

Despite the strong role agriculture is expected to play in the socio-economic upliftment of our country, most of our Agriculture teachers are still poorly prepared to teach the subject at senior secondary school level.

In a few schools, learners have been lacking textbooks in as many as four of their subjects, including Agriculture, as late as the second month of their examination year (Swarts, 1995:13). The limited availability of agricultural infrastructure, resources, subject content and pedagogic knowledge ends up making most of the Namibian teachers teach the subject from a textbook. Furthermore “Teachers whose subject knowledge is inadequate tend to rely too heavily on the textbook and tend to discourage learner initiative” (West, 1995:23). According to Dupriez & De Leener (1998:iv), “Agriculture is a difficult subject. There is much to observe, to explain, to understand and a single book can only be a tiny step in the right direction”. It is of utmost importance for Agriculture teachers at senior secondary school level to be familiar with other prescribed textbooks in their subject, and also with other relevant books which can be used to supplement the information in the prescribed textbook for the syllabus that they are using (West, 1995:27).

In addition, it is often the case that the only type of teaching media some teachers use in their Agriculture lessons is talking and the use of a chalkboard. “Some teachers spend time writing up notes on the chalkboard to be copied down” (Swarts, 1995:13).

According to NIED (1995:4), “teaching science nowadays has changed from this teacher-centred and teacher-talking approach to a much more investigative approach which is part of the learner-centred method”. Furthermore children learn science by moving from concrete experience to abstraction, by hands on activities, and by creating their own models and theories (Nafziger, 1998:61).

In most of the Namibian schools Agriculture does not enjoy the status accorded to other natural science subjects but being a science subject it does not enjoy the status accorded to other pre-vocational subjects (Muyunda, 2001). In many schools it is a

subject that is simply incorporated into the curriculum in order to add up to the number of subjects required to make up a certificate.

There is a common belief that any teacher, regardless of his or her field of specialisation, can teach this subject. This notion is portrayed by the failure of the Namibian government to provide Agricultural Education to the aspiring teachers of Agriculture in tertiary institutions. This scenario can be attributed to the fact that many parents and learners alike believe that pre-vocational subjects such as Agriculture are only meant for “not-so-bright” learners (Mannel, 1995), hence the lack of serious attachment to the subject.

Based on these highlighted shortcomings and the strong emphasis put on agriculture in the Namibian context, my argument is “how will learners cope with the situation in the formal sector if they are still being inadequately prepared in this field?” This argument is reflected in the poor results obtained in most of the schools which offer the subject.

It is equally important that the curriculum, along with the prescribed curriculum documents such as the broad curricula, syllabuses, teachers’ guides and textbooks, should be regularly revised, since knowledge is not static. In support of the point raised here, one of the discussion documents maintains, “greater consistency can be achieved as broad curricula and subject syllabuses are revised in the normal processes of ongoing curriculum development” (NIED, 2003:22).

In order to identify the focus for my research topic I have reflected on personally published theses and documents written on the subject by other researchers and educationists. I have concluded the focus will be on the factors relating to the teaching and learning of agriculture, both nationally and internationally.

2.6.2. Translating the policy into curriculum at the national level

The teaching and learning of Agriculture in Namibian schools is driven by the Namibian Education Reform recommendation based on the four goals of education, namely access, equity, quality and democracy, which have to bring about lifelong learning in learners (Namibia. MEC, 1993). Therefore, the aim for senior secondary education in Namibia is to achieve a broad and balanced command of knowledge,

skills and attitudes in the cognitive, affective, and psychomotor domains (Engelbrecht, 2002:6).

Recently the Ministry of Education has issued a new syllabus for Senior Secondary School Agriculture known as the 'Namibia Senior Secondary Certificate (NSSC) Agriculture for Ordinary Level'. This has been designed by the Namibians themselves as a two-year course for examination. The revised syllabus statement for Agriculture has the following emphasis: "The main objective of the syllabus is therefore to equip learners with the necessary knowledge, skills and attitude that will enable them to enter tertiary education or the world of work" (Agriculture Syllabus, 2006:2). Therefore work should be understood in a broad spectrum to include salaried employment, self-employment, small-scale farming, family life, household management, and self-improvement (Namibia. MEC, 1993:92).

The syllabus replaces the University of Cambridge Local Examinations Syndicate as the examining board for the International General Certificate for Secondary Education (IGCSE). The IGCSE agriculture curriculum concentrated on skills and processes, interaction between teacher and learners and between learners and their fellows (West, 1995:25).

The new syllabus was implemented in 2006 with the current grade 11 learners and it will be first examined in 2007 (Namibia. MoE, 2005). "The syllabus is designed to meet the requirements of the Curriculum Guide for Senior Secondary Education for Namibia and has been approved by the National Examination, Assessment and Certification Board (NEACB)" (Namibia. MoE, 2005:1).

Teaching and learning in this syllabus is still guided by the learner-centred education. "Thus the Namibia National Syllabi provide opportunities for developing essential, key skills across the various fields of study. Such skills cannot be developed in isolation and they may differ from context to context according to a field of study" (Namibia. MoE, 2005:1). In addition, "the main focus of the Agriculture syllabus is to develop a critical understanding of the interrelationship between science and technology, society and environment" (Namibia. MoE, 2005:2).

The University of Namibia, which trains senior secondary school teachers, offers all subjects required at this level of study apart from Agriculture. At senior secondary

school level, teachers employed to teach Agriculture often are those who have studied Agriculture through correspondence courses with one of the South African universities; this training is theoretically based without any practical experience.

In other more fortunate senior secondary schools there are teachers who have done diplomas in Agriculture without a teaching qualification, but those who want to take a teaching qualification may do so with any university of their choice. The danger here would be that this teaching qualification is a general education one which does not include Agriculture as a teaching method (Muyunda, 2001).

2.6.3. Translating the policy into curriculum at an international level

In order to make use of teaching and learning in any situation, there must be an aim for doing so. According to Engelbrecht (2002:4), “if you want to provide an effective education, you must know what your aims are – where do you want to go”. Therefore “aims are important for achieving quality education in Namibia or any other country” (Engelbrecht, 2002:5).

In addition Engelbrecht (2002:6) is adamant that secondary school teachers should keep the aims of their country’s educational system at the back of their minds, because these aims require them to achieve a lot more than the mere transmission of subject knowledge.

A comparison of the aims of secondary education systems of the United Kingdom, United States of America, Malaysia, Kenya, Malawi, Zambia and Botswana by Engelbrecht (2002) were found to compare favourably with that of Namibia.

A study by Brunette (2002) considered the relative success of agriculture in the school curriculum of a number of countries including countries such as Kenya, Germany and Japan. The Kenyan focus on the so-called Harambee schools created to provide pre-vocational training to learners in achieving the educational aims and objectives in Kenya. Brunette (ibid.) ascribed their failure in achieving their objectives as pre-vocational institutions to a variety of factors. In particular he commented on the importance of making the curriculum for learners relevant and the use of modern teaching aids and the provision of materials, which should support content. In addition

(Brunette, 2002:127) stated that “practical skills rather than academic skills ought to be taught”.

On the other hand he felt that the German education system provides opportunities for all Germans, irrespective of ability or interest, and it provides education and training for the different needs of industry and agriculture (Brunette, 2002:145). This system of education provides the following objectives and opportunities:

German society is a democracy with the objectives of education anchored in the constitution, and therefore the objectives echo the framework of the German style of life. It is primarily concerned with the moral personality and the inner freedom of the individual and has its chief aim that of the transformation of each learner into a worthy being whose life is determined by the desire for values. It is clear that huge emphasis is placed on the intellect, social adaptation, and service to the community and progressive development which lead to the social and material progress of the democratic society.

(Brunette, 2002:142)

When comparing the Japanese educational objectives, which are to encourage the development of young people, place more emphasis on the essential knowledge and skills; attach more importance to the nurture of children’s capacity, and put more value on developing in children an attitude of respect with the ones for Namibia, one finds that the Japanese educational objectives are typical of a highly developed country (Brunette, 2002:158-9). The Japanese educational system puts much emphasis on bringing the knowledge, skills, abilities and attitudes of the individual in line with the economical and industrial needs of the country (Brunette, 2002:159).

An analysis of how Agriculture is taught in some of the states of the United States of America (USA) – Tennessee, Mississippi, Minnesota, North Carolina, Arkansas, Illinois, Oregon, Oklahoma, Kentucky, Florida, and Missouri-Columbia – was interesting in the context of my study.

Segler-Conrad, Joerger & Leske, (n.d.) emphasised the importance of agriculture in the USA saying that agriculture in the United States continues to be one of the largest employers with more than 22 million people in some phase of agriculture. Swafford (National Research Council, 1988) further underscored this point, saying “Agriculture has been and always will be a vital component of American society. American agriculture feeds and clothes millions of Americans as well as residents from other countries”.

One study carried out in America reported that agriculture was not taught in elementary schools and has been isolated in vocational agriculture departments at the secondary level (National Research Council, 1988 in Swafford, 2005). In 1988, the National Research Council recommended that agriculture courses be expanded to increase scientific and technical content to better prepare students for advanced study and employment in the changing food and fiber industry (National Research Council, 1988 in Warnic & Thompson (n.d.).

Despite the fact that over reliance on the use of textbooks in teaching Agriculture is being condemned in Namibian schools when used by the untrained teachers of Agriculture, Swafford (Woodward, Elliot & Nagel, 1988 in Swafford, 2005) supports the use of these books. He believes textbooks are an important tool in the implementation of the Agriculture curriculum in the classroom because they contain not only narrative but also colour photographs and graphics, chapter exercises, worksheets and other activities.

Referring to the importance of merging Agriculture with Science (Project 2061 in Osborne & Dyer, n.d.) stated that the American Association for the Advancement of Science has recommended that applications of science be taught in relevant technological fields, such as agriculture.

In many cases, high school students are not informed in a systematic way about the food and agricultural sciences because many high schools lack the physical and human resources to develop an awareness of and appreciation for science-related programs (Dolce, 1984 in Wiley et al., n.d.).

One of the most recommended methods of teaching science related subjects is inquiry-based learning which is very similar to problem-based learning (Parr & Edwards, 2004). According to Darling-Hammond & Anderson, 1977(in Knoblock & Whittington, n.d.) teachers are considered to be the single most important variable related to student achievement, and their expertise and beliefs influence the success of an agricultural education program.

2.7. Conclusion

In this chapter I focused my discussion on how Agriculture is currently taught at senior secondary school level in Namibian schools. To understand why the Namibian education system decided to incorporate the subject in the curriculum, I looked at the status accorded to it in the past, present and future by different managers of the educational systems of a particular given time-frame as well as their intention at each given period of time.

The guidelines which are stipulated in the subject policy document were also followed in order to gain an insight in how this subject is expected to be taught in senior secondary schools. Further to this relevant literature pertaining to the implementation of the curriculum was also consulted and analysed.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research design that I used to conduct my research. The research design selected was determined and shaped by the research question which focuses on the perceptions and implementation of Agriculture in selected senior secondary schools in Namibia. In this chapter, I also attempt to create methodological consistency through the relationship of the research design, the data collection tools and the data analysis.

3.2 Research design

A research design is explained as the umbrella-organising framework for the research; it provides the theoretical framework for the research. The framework of the study shapes and informs how data is collected, what data is collected and how data is analysed. The research design also informs the sampling procedures and selection of participants and, above all else, the research design shapes the ethical protocols within which the research is done (Maxwell, 1996).

This discussion focuses on the interpretive case study orientation, which was applied in this study. Since the focus in this research is on understanding and meaning-making, I decided to situate my research in an interpretive orientation. Meaning-making requires the researcher to work closely with the research participants and to engage fully in the context of the phenomenon being studied (Patton, 1990; Cohen & Manion, 1994).

I drew on the ideas of Cohen and Manion (1994:37), who stated that “Interpretive researchers begin with individuals and set out to understand their interpretations of the world”. Based on this idea my study was designed to provide me with rich data that would help me to understand my participants’ views, beliefs and practice so that I could better understand how I could develop my own practice, hence the selection of two schools in order to meet with the teachers so that I could share with them their

ideas, perceptions and opinions regarding how they implement the Agriculture curriculum in their schools.

Following Stake (1995:8-9) my study responded to his view of the importance of “Placing an interpreter in the field to observe the workings of the case, one who records objectively what is happening but simultaneously examines its meaning and redirects observation to refine or substantiate meanings”.

It was only by interacting with these teachers during and after teaching and learning periods that I could really gain a full picture of the learning and teaching of this subject. Cantrell (1993:83) also highlighted this when he stated that an interpretive orientation aims to “understand daily occurrences and social structures as well as the meanings people give to the phenomenon”.

Therefore the purpose of conducting a study such as this is to reach a deeper understanding of the case in point and may serve to illuminate issues and aspects that may well be lost in a broader survey. However, I am aware of the key problems that have been identified with this orientation. One of the problems is that the interpretive paradigm, has been questioned on the basis of validity (Kristensen, 1999:67). Further to this, Stake (1994:263) states “validity depends on the use to which the findings are put and the researcher’s and reader’s point of view”.

3.3 Selection of the research respondents

This research, as indicated earlier, was conducted in the Caprivi Region where there are 44 schools that offer Agriculture at both junior and senior secondary school levels. There are only three schools that offer this subject at senior secondary school level in the whole region, and I therefore conducted my research in two of these three schools and purposeful sampling was used to select them.

According to (Mugo, 2006:1), “Purposeful sampling selects information rich cases for in depth study”. Since I wanted an in-depth study of my research topic in the selected schools, I considered this approach as the most appropriate one for my sampling purposes.

I invited three teachers to participate in the study (referred to as teachers B, C and D). These teachers, who were all male, were selected because of their experience in teaching Agriculture at senior secondary school level. I thought that by involving them in my research, they would provide deeper insights than less experienced teachers. Their schools were labelled with letters X and Y (refer to Chapter 4 for the summary of school and teacher profiles).

3.4 Research Method: A qualitative case study

Given the small scale nature of this study I took note of Bell (1993:8), who claimed that “The great strength of the case study method is that it allows the researcher to concentrate on a specific instance or situation and to identify, or attempt to identify, the various interactive processes at work”.

Further to this it is suggested that an interpretive orientation is complemented by the adoption of a case study approach as the case study is able to provide the focus and context for understanding and meaning-making (Bell, 1993; Cohen & Manion, 1994).

Drawing on Basy's ideas that “A case study is the study of a singularity which is chosen because of its interest to the researcher and, it is hoped, the reader of the case report” (1999:75), I felt that a case study would best help me to investigate my concerns about the teaching of agriculture in the existing formal education structures of Namibia.

Using a case study approach allowed me to answer my particular research questions: as Yin (2003:1) put it, “In general, case studies are the preferred strategy when ‘how’ or ‘why’ questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context”. In addition, Bell (1993:8) stated that the case study approach is particularly important for individual researchers because it gives an opportunity for one aspect of a problem to be studied in some depth within a limited time scale.

Because I have chosen an interpretive orientation, I have linked the study to a qualitative approach. I decided on a qualitative approach primarily because I wanted to produce a wealth of detailed information from a small number of respondents. In confirmation of this Patton (1990:14), stated that “qualitative methods typically

produce a wealth of detailed information about a much smaller number of people and cases” and according to Mcmillan and Schumacher (1993:14) qualitative research is concerned with the understanding of a “social phenomenon from the participants’ perspective”.

However, having chosen this method I am aware of the limitations of a case study, one of which is that “It is difficult to cross-check information and so there is always the danger of distortion” (Bell, 1993:9). In addition, Bell (1993:9) pointed out that in a case study, generalisation is not usually possible as the value of the study of single events can be questioned by critics.

However, in spite of these I believe that this approach helped me to find answers to my research questions, which are:

- How is the Agriculture curriculum implemented at senior secondary schools in Namibia?
- What strategies and resources are used to implement Agriculture at senior secondary schools in Namibia?
- How are the identified resources and strategies used to teach Agriculture at senior secondary schools in Namibia?

Given the criticisms of this approach I decided to use a variety of data gathering instruments as has been suggested (Bassegy, 1993; Bell, 1993; Yin, 2003) so that I could view my research topic from different angles as discussed in the next section.

3.5 Data collection

This section discusses the tools, procedures and strategies that were followed and used in the research process to collect data for the research topic, and these are:

- Semi-structured interviews,
- Class observation,
- Document analysis, and
- Stimulated recall.

Before selecting the above-mentioned tools I had to decide whether or not they would be suitable for my data collection. As Bell (1993:63) stated, “Decisions have to be

made about which methods are best for particular purposes and then data collecting instruments must be designed to do the job”.

3.5.1 Semi-structured interviews

I chose semi-structured interviews as one of my data gathering tools because an interview enables an interviewer to easily follow up ideas, probe responses and to investigate motives and feelings (Bell, 1993). In addition, “The data from interviews consist of direct quotations from people about their experiences, opinions, feelings, and knowledge” (Patton, 1990:10). Furthermore an interview allows for greater depth than is the case with other methods of data collection (Cohen & Manion, 1994:272).

However, I am also aware that an interview has certain limitations as Bell identified it as “ a highly subjective technique and therefore there is the danger of bias” (1993:91). However, despite this shortcoming I found using interviews valuable, particularly because of the semi-structured interview format. These interviews used in the research were first piloted (see Appendix 2). The pilot stage of this research revealed the value of the semi-structured interviews, which is that “Semi-structured interviews allow for both responding to pre-determined questions and free responses” (Lotz, 1996:96). By using the semi-structured interviews, I was able to get detailed and rich responses from the respondents. These interviews enabled the respondents to have freedom and engage in rich conversations through which they could easily explore their thoughts without the fear of being intimidated by closed questions.

I had, however, to guard against becoming a victim of the highlighted problem of bias during the data gathering exercise whilst using this instrument.

I sought permission from the respondents to use a tape recorder as well as to use note-taking before actually using them during the interview sessions, and it was granted. The tape recorder was used to capture the respondents’ unique expressions as well as assisting me to transcribe the interviews when I needed to use direct quotations. Note-taking assisted me to concentrate and feel that I was part of the interviews as well as capturing the respondents’ body language, a thing the tape recorder could not do. Furthermore, note-taking records the actual evidence obtained from your sources (Bell, 1993:29).

Before embarking on the data collection exercise, I decided on a time line (see Appendix 3) as a means to manage the interviews, and to provide a framework to accomplish my data collection process in the time available. Thereafter I designed my interview questions (see Appendix 4) that were aimed at investigating the three teachers' perceptions, expectations and achievements in the implementation of the senior secondary Agriculture curriculum in their respective schools.

3.5.2 Class observation

I regarded class observation as being important in the data collection process because it gave me an opportunity to both build on and verify the responses given by the respondents in the interviews, for as Stake (1995:60) indicated, the importance of using observations was that it increased understanding of the case being studied. Furthermore, Connolly (2005:93) stated that "Observational evidence is often useful in providing additional information about the topic being studied".

This approach accorded me the opportunity to get first-hand information and experience about how the Agriculture curriculum was implemented by these three teachers in their classrooms (Cantrell, 1993). Furthermore, "Direct observation may be more reliable than what people say in many instances. It can be particularly useful to discover whether people do what they say they do, or behave in the way they claim to behave" (Bell, 1993:109).

Classroom observation was done in conjunction with a stimulated recall interview. Stimulated recall was done face-to-face with these teachers in order to give them a chance to clarify issues or matters of interest that arose during their lesson presentations. This is in accordance with Van Dalen (1979) who says that in a face-to-face meeting, an investigator is able to encourage subjects and help them probe more deeply into a problem.

Borrowing Van Dalen's idea I decided to come up with some lesson indicators (Appendix 5) that I incorporated in my class observation sheets (Appendix 6), so that they could help me follow how these teachers implemented the Agriculture curriculum in the classrooms. I also used these lesson indicators together with the stimulated recall interviews (Appendix 7) to probe their teaching strategies after they had finished teaching.

These data gathering tools cannot be claimed not to have had any weaknesses when used in the data collecting process due to my own bias that may have distorted my findings. To try and limit this shortcoming, I added triangulation to my data gathering tools, which were further assisted with member-checking (Lather, 1986; Cohen & Manion, 1994).

3.5.3 Document analysis

This is an equally important strategy of data collection because it provides information, which could not be obtained through interviews and observations. In addition Stake (1995:68) suggests that gathering data by studying documents follows the “same line of thinking as observing or interviewing”. According to Hopkins (1993), document analysis is very important because it provides information and understanding of what is happening in the classroom.

It is for these reasons that I decided to use this strategy because it provided me with evidence about how these teachers implemented the Agriculture curriculum in their respective classrooms based on the requirements of the Namibian educational philosophy of learner-centred education.

In this study the documents I included were: the subject syllabus (Appendices 8a and 8b), teachers’ schemes of work (Appendices 9a and 9b) and lesson plans (Appendices 10a, 10b and 10c). I also included learners’ activity books (Appendices 11a, 11b and 11c).

3.6 Data analysis

In this case study, the data collected by means of interviews was first transcribed before using the classroom observations and document analysis. In this case qualitative data analysis means “working with data, organizing it, breaking it into manageable units, synthesizing it, searching for patterns, discovering what is important and what is to be learned (Bogdan & Biklen, 1982:145).

During this phase I used an interpretive approach which focused on an understanding of data and meaning (Bell, 1993). Since I had only three respondents it was easy for

me to run through their responses per question whilst using the pseudonyms I gave them. Thereafter I put the corresponding information gathered from all of them into categories and then I could see layers of data emerging in the form of patterns or themes (Patton, 1990). These themes or patterns were derived from the “recurring patterns that cut across my data” (Taylor & Bogdan, 1984: 139 cited in Merriam, 1998:179).

After having analysed the interviews, I then did the document analysis and classroom observations. When analysing data from documents and observations, I first came up with some indicators as shown in Appendix 5, and it was against these indicators that some more patterns from the data emerged.

A further processing of data from a combination of these three instruments gave rise to different themes and sub-themes that are indicated in Chapter 4 and were all related to the main research question. These themes or categories were further analysed and processed giving rise to sub-categories that are discussed in Chapter 5 whilst drawing some ideas from Chapter 2. The data when processed was given to the respondents to check that their responses had been fairly represented.

3.7 Validity in case study research

Validity is important in case study research because it tells us whether an item describes what it is supposed to (Bell, 1993:65). According to Bassey (1999:75), “validity is the extent to which a research fact or finding is what it is claimed to be”. In a qualitative study the information and findings presented should match reality (Merriam, 1998). In trying to ensure that validity and trustworthiness in my research topic prevailed, I decided to use multiple methods of data collection as indicated in this chapter.

Using the stimulated recall and member checking accorded me an opportunity to share the interpretations of the study with the teachers in order to verify my reporting (Lather, 1986). In order to guard against bias, I kept on reflecting on my intentions throughout the data collection process (Maxwell, 1996; Merriam, 1998).

Using multiple methods in research processes can be termed as triangulation. According to Cohen and Manion (1994:233), “Triangulation may be defined as the

use of two or more methods of data collection in the study of some aspect of human behaviour". And this is exactly what I did in my research: I used all the methods discussed in this research presentation. Furthermore the use of triangulation helps to avoid bias since the exclusive reliance on one method may bias or distort the researcher's picture of the particular slice of reality he or she is investigating (Cohen & Manion, 1994; Yin, 2003).

3.8 Ethics in interpretive research

As a researcher, since I was aware of the ethical issues involved in research, I had to address these before embarking on the data collection exercise. Even though we already knew each other I had to explain the purpose of my research. "You should always introduce yourself and explain the purpose of the research, even if you have an official introductory letter" (Bell, 1993:97). We also negotiated the use of a tape recorder and note-taking to record their responses.

Before conducting the interviews, therefore, I first met the teachers and negotiated with them about the purpose of my data collection and to make an appointment to meet them. They all responded favourably (see Appendix 12a). Thereafter I approached their school principals and introduced myself to them, and then I made an appointment with them as to when we could meet to which they had no objection (see Appendix 13).

All the interview sessions took place during the day after school time on the school premises in the teachers' respective departmental offices. During the interview transcription process, I quoted the interviewees word for word so as to make their voices heard during the interview session as well as to ensure authenticity of their responses. In order to verify the responses I got from the respondents in the interviews, I used observation as a tool for gathering data as discussed in the next paragraphs.

Upon reaching an agreement, I provided each one of them with a consent letter, which they asked them to sign (see Appendix 12b). As defined by Diener and Crandall (cited in Cohen & Manion, 1994:350), informed consent is "the procedure in which individuals choose whether to participate in an investigation after being informed of facts that would be likely to influence their decision". After this exercise I then

approached the school principals and introduced myself to them, whereafter I indicated to them the purpose of my visit. Then I informed them that I had already discussed the issue with their teachers, they then gave me permission to go ahead with my research. Subsequently I had to give them a letter that they had to sign as authorisation for me to carry out research in their respective schools with their teachers.

During the process of seeking permission from both the teachers and the school principals an assurance was given to them that confidentiality and anonymity during the implementation of this exercise would be observed. According to Cohen and Manion (1994) the essence of anonymity is that information provided by participants should in no way reveal their identity.

Confidentiality means that although researchers know who has provided the information or are able to identify participants from the information given, they will in no way make the connection known publicly (ibid.:367). To ensure that confidentiality and anonymity were adhered to, pseudonyms were used for the participants and the participating schools.

3.9 Limitations

The study had limitations regarding the size of the sample that was researched, as it was too small to allow generalisation to take place. The findings were not a true representation of how Agriculture is taught in all the senior secondary schools of Namibia as a whole.

3.10 Conclusion

In this chapter I discussed the research methodology and procedures that I used and followed respectively in order to conduct the case study of my research topic. I further described the research design decisions I made as well as the various methods I used to collect data which are relevant to my research questions. The research design orientation adopted in the case study was also discussed, and the number of the research participants along with their respective schools are mentioned and described.

I discussed the approach I adopted when analysing data as well as the procedures used in making sure that validity and trustworthiness are adhered to during the data collection process. Ethical issues that were followed during the data collection process were also outlined and discussed.

CHAPTER 4

PRESENTATION AND ANALYSIS OF DATA

4.1 Introduction

Data obtained from the case study are presented and analysed in order to examine how these teachers implemented the Agriculture syllabus at senior secondary school level and how they understood the teaching of the subject. These data were derived from individual teachers through interviews, document evidence and lesson observations in these schools within the Caprivi Region. The data presented in this chapter have emerged from a preliminary analysis of the interviews and lesson transcripts as well as teachers' use of the syllabus and the subject guides. The presentation of data uses both the structure of the interview and a thematic approach in the case of lessons, syllabus, teachers' guides and documents. Where relevant the actual words of the respondents have been used to add to the authenticity of the data.

This chapter begins with the interviews with teachers which were transcribed and analysed (see Appendix 4). These interviews were structured so as to gain an understanding of teachers' views about the Agriculture syllabus they teach. This is followed by the presentation of classroom observations and finally the document analysis, which is analysed thematically.

4.2 A brief contextual analysis of the participating schools

The study focuses on the two senior secondary schools in the Caprivi Region which offer Agriculture as part of the curriculum. One of these schools is within the town of Katima Mulilo, the headquarters of the Caprivi Region, and the other is 65 km west of this town.

School X, within the town of Katima Mulilo, has approximately 30% of the learners taking Agriculture at senior secondary school level (grade 11-12 boys and girls). The learner teacher ratio at this level in this subject is 1:26. There are only two teachers teaching Agriculture at this level, both of whom are male and both were part of the study.

School Y is a rural school, like school X it also has approximately 30% of the learners taking Agriculture at the senior secondary school level; this includes both boys and girls. The learner teacher ratio at this school is 1:20. Like school X, school Y also has two teachers teaching Agriculture at this level, one male and one female. The male teacher opted to be part of the study as he is the more experienced teacher of the two.

Visits to these schools revealed that they do not have access to farms, laboratories, farm machinery, farm infrastructures and other related agricultural implements which could be used for practical purposes. However, school Y, being a rural school, enables teachers to conduct some practical activities for their learners on the local community's fields. The farmers in this community are mostly subsistence farmers.

4.3 Participants' interviews

As indicated in the methodology chapter, three schools within the Caprivi Region, which offer Agriculture, were involved in the research and four teachers were interviewed. The junior secondary school, which formed the pilot study, will not be used in this analysis (see Chapter 3).

4.3.1 Background information of teachers interviewed at two sample schools

Table 1 gives information relating to the teachers' qualifications and experience in teaching Agriculture at school:

Table 4.1: Composition and background of the research participants

School	Teacher	Sex	Grade(s) taught	Teacher qualification	Teaching experience	Current Studies (Agriculture Field)
X (Urban)	B	M	12	Grade 12 + NDA + Dip.Ed. (Biology) + B.Ed. (Hons) Curriculum Studies	7 years	None
X (Urban)	C	M	10 & 11	Grade 12 + NDA + HED	7 years	None
Y (Rural)	D	M	11	STD 10 + ECP + HED + B.Ed. (Hons) (Educational Management)	5 years	None

Acronyms:

STD	- Standard
HED	- Higher Education Diploma
ECP	- Education Certificate Primary
NDA	- National Diploma in Agriculture
Dip. Ed.	- Diploma in Education
B.Ed. (Hons)	- Bachelor of Education (Honours)

From Table 4.1 it is evident that the teachers interviewed are exclusively male. The male orientation of my research is representative of the wider picture of classifying Agriculture, Mathematics and other science related subjects as being male-oriented subjects. While one of the teachers at school Y is a female I did not feel it fair to involve her in this study, as she is newly qualified.

It is worth noting that all the teachers in this study who were interviewed and observed teaching Agriculture at senior secondary school level, have approximately the same number of years teaching experience in this subject and none of them has furthered their studies in the field of Agriculture beyond their original qualification.

Of the three teachers, two have a 3-year full time National Diploma in Agriculture obtained from a National Agricultural College. This means that originally they did not have an initial educational qualification, but have since remedied this situation and are now in possession of a professional qualification. The third teacher studied Agricultural Education through a correspondence course.

4.3.2 Teachers' perceptions of the Agriculture Curriculum

The results presented in this section are based on the responses of the teachers in the initial interviews held with them.

Views regarding relevance of the curriculum

The strong focus on the notion of relevance in the literature and the need for the learners to perceive the relevance of the curriculum meant it was important to include this dimension in the interview.

When the teachers were interviewed about their perception of the relevance of the curriculum, all three were aware that this curriculum has been revised and changed from the University of Cambridge Local Examination Syndicate to the Namibian Curriculum in order to address the policy of Namibianisation. When asked if there is any difference between the current revised curriculum and its predecessor, all three teachers responded that there is only a slight difference and most of it is still the same as the old curriculum. They also mentioned that the grade 12 learners of 2006 will be the last ones to use the Cambridge curriculum and that the grade 11 learners of 2006 have already adopted the current revised Namibian curriculum.

When asked for their opinions on the revised curriculum regarding how it meets the learners' needs, these teachers had more or less similar opinions. Teacher D indicated that *"The curriculum is good it is covering all the aspects of agriculture from arid farming to general agriculture to crop production, animal production, farm machinery, farm structures including Agricultural Economics"*. Teacher C responded that *"I think it is quite relevant since many areas have been covered that are relevant to the Namibian conditions. Some of the important areas that have been covered include the soil zones of Namibia and also the impact of HIV/AIDS on the agricultural sector"*. Teacher B said:

I am seeing it in a way that it is able to give them the necessary skills and knowledge for them to learn Agriculture so that they can use it in the real life situation upon completing their school, so the curriculum itself allows them to acquire self skills that can help them to do their own projects in the end.

The second question asked teachers to consider the easiness or difficulty by which the syllabus topics could be taught and learnt by their learners. Their response was that the syllabus was 'moderate', by which they meant there were topics that were easy to teach and learn by teachers and learners respectively and there were some that were difficult. They went on to say that the syllabus was balanced as it accommodated high achievers, middle achievers and low achievers.

These responses suggest the three teachers were generally happy with the revision, however, Teacher C felt fish farming could have been included while Teacher D felt that there should have been more emphasis on practical things such as vegetable growing and fruit production (those things which can help people see agriculture in

reality). He added that even though some topics are relevant, there are some which require much research by the teacher. He referred to HIV/AIDS, which he said cannot be found in a common textbook and necessitates the teacher to carry out further research. Teacher D found the issue of the language used in the syllabus to be problematic. According to him the language that is used in the syllabus is very advanced for the learners. Teacher C emphasised the lack of farm machinery and learners' difficulties with agricultural mathematical calculations to be key problem areas.

When asked if there are topics which the teachers wanted to be removed from the syllabus, they indicated that there are none. Even though Teacher D was in agreement with the other two teachers, he said:

I think some topics are good but not topics like the 'soil zones of Namibia', it was going to be better if they could just leave them as 'the soil zones of your region', then learners in Caprivi Region would study the soil where it is located rather than studying the soil zone of Keetmanshoop where you are not staying.

These teachers were of the opinion that there should be more topics added to the senior secondary Agriculture syllabus. These topics included the implementation and management of agricultural projects and agro-forestry. They also felt there should be more themes within the syllabus. Possible themes to be included could relate to leaf and root crops, fruit tree production, and pruning trees.

When emphasising the inclusion of 'agro-forestry' in the syllabus, teacher B said, "...we need this topic to be there because it will help the learners to pursue studies in forestry so that they can obtain some diplomas and degrees in forestry".

Teacher C added to this by saying,

The emphasis is on national objectives as captured in the vision 2030, such as the eradication of poverty; the one that should eradicate poverty is the implementation of agricultural projects.

None of the teachers interviewed fundamentally questioned or challenged aspects of the curriculum other than aspects of content and to raise the issue of practicals.

Views on assessment practices

The assessment practice, which is included in the syllabus, was an area in which the teachers' opinion was sought. They all indicated that the assessment practices are very clearly stated.

According to Teacher C, the assessment methods used in the syllabus were clear, even though he felt that some of the teachers do not have the necessary skills to implement the assessment methods. Teacher D complained that they had problems in the school by not having proper photocopying machines. He further indicated that, according to the rules, the syllabus must be photocopied and displayed on the notice board so that learners can see the scheduled assessment.

Views regarding time management

Regarding time allocation for this subject, Teachers B and C complained that the time allocated to the subject is not enough, being both a theoretical and a practical subject. Instead, they suggested that periods should be increased to either 6 or 7 periods a week. Teacher D responded thus:

We have 6 periods a week for Agricultural Science; I think it is okay, maybe where we would want more time is in the afternoons, because of practicals, which I would want to be scheduled for the afternoon.

4.3.3 Teachers' understanding of the goals and objectives of teaching Agriculture

All three teachers interviewed supported the idea of teaching Agriculture at senior secondary school level. Teacher B was of the opinion that *"this subject has to be taught at senior secondary school level because it is the only way that agriculturally oriented people are going to be produced"*. Teacher C added to this saying that because of the importance of agriculture to the Namibian economy, the subject should be taught at this level in order for learners to acquire the desired agricultural skills. Teacher D added that Agriculture has to be taught to this level of learners because it teaches them some skills, knowledge in food production and food security. He went

on to say that in the absence of public service employment, learners can be self-employed.

When it came to seeking their opinion regarding the goals and objectives of teaching Agriculture, all three teachers clearly showed that they understand the goals and objectives of teaching Agriculture. According to Teacher B, objectives should show that by the end of the academic year learners should be able to interpret and understand the 'principles of farming' and this could be one general objective. He added that "*the senior secondary school syllabus is user friendly because objectives are clearly stated in it*".

Teacher C, when responding to the question about goals and objectives, stated, "*I think the approach is the one we are missing but the objectives are very clear. The implementation of the curriculum is where we have a problem because learners are only taught theory without practice, instead these two are supposed to go hand in hand*".

Teacher D responded by saying "*The curriculum objectives for Agriculture at this stage are okay, they are well formulated, they develop knowledge, understanding, insight, skills and values*".

These responses highlighted the problem I found over and over in the lessons I observed, namely the difficulty of applying the subject practically.

Comments of the three participants regarding their views about meeting the curriculum objectives are tabulated below:

Table 4.2: Participants' views about meeting the curriculum objectives

Teacher B	Teacher C	Teacher D
<i>The most difficult part is the imparting of skills because facilities are not enough for example transport for learners to travel and see some agricultural projects, agricultural research stations and elsewhere, as a result most of the things</i>	<i>Most of the parts of the syllabus objectives are attainable and relevant because there is a need for Agricultural education to the Namibian learners, the only problem we experience is not the inclusion of farm machinery which is also a</i>	<i>I think the difficult curriculum objectives to achieve are those ones that require practicals for example those that focus on farm machinery, farm structures the reason being that the school hasn't got an experimental farm where learners could be</i>

<p><i>are done on the ground of the school premises. Due to this handicap most of the things are learnt theoretically.</i></p>	<p><i>difficult component for most of the teachers to teach as experienced at junior secondary school level where it is included. The major reason being that first hand experience to learners is difficult to provide since communal farmers who in most cases don't use farm machinery, surround the school.</i></p>	<p><i>taken to go and see these things in operation.</i></p>
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One can deduce from the responses given by these teachers that the absence of agricultural resources (emanating from lack of funds) hampers the effective implementation of the adopted senior secondary school agriculture curriculum. The focus of Agriculture is the development of practical and cognitive skills. One wonders how the development of practical and cognitive skills can be achieved in our learners if the schools lack vital agricultural resources.

One other important component hampering the effective implementation of the Agriculture curriculum at senior secondary school level is the issue of mathematics. Teacher C stated it thus:

Mathematics at this level is a problem because most of the learners who come to take Agriculture at senior secondary school level don't have a good background from wherever they have come from and some of them may have not done any mathematics at all prior to the taking of Agriculture as a subject. The major problem is that some topics included in the syllabus require background knowledge of mathematics in order to understand them better but this is lacking in most of our learners thus making them handicapped in this subject. In trying to remedy the situation a teacher is forced to teach the learners basic mathematics.

It must be remembered that Agriculture is an applied science; therefore it needs to be based on a sound mathematical foundation (see Chapter 2). This comment by Teacher C is therefore of concern.

4.3.4 Teachers' use of the syllabus and guides of Agriculture

The intention in the series of questions presented in this section was to find out whether teachers received up-to-date documents and how they were used in implementing the curriculum. This was felt to be important because without these documents there is a danger that these teachers could teach this subject outside the subject policy, which could be detrimental to the learners. Learners have to sit for public examinations, which are based on the subject policy.

The results of the findings indicated that all teachers had received a revised new syllabus. In support of this claim each teacher responded as follows:

Teacher B: *"Currently we received a new one last year November, 2006/2007 Namibian syllabus...we have all the syllabuses, 2006 and 2007 which is currently for the grade 11 this year who will be the grade 12 in 2007"*.

Teacher C said, *"The first one I got when I attended a workshop in 2005 and the second part I received it this year, 2006"*.

Teacher D said, *"This one I am teaching from is a new one; it is called 'Namibia Senior Secondary Certificate Ordinary Level' because we have changed from the Cambridge now"*.

Evidently these teachers have the revised syllabus for the senior grades of Agriculture. What is interesting in their responses is that none of them were apparently aware of the various revisions that had been done to this syllabus prior to the adoption of the local Namibian syllabus. On the basis of the responses given by the teachers, it would appear they needed documents detailing the various revisions, which could have assisted them to teach the updated versions of the subject in their respective schools. The syllabus documents also appeared to be the only documents available to these teachers as there were no teacher guides or other documents at these schools.

4.3.5 Methods applied in teaching Agriculture in and outside the classroom situation

When asked about how they teach and present Agriculture in the classroom context, the teachers said they use a variety of teaching methods, such as group-work, debates, lecturing, as well as question and answer methods and demonstrations. In response to the question about the type of teaching methods used in teaching Agriculture outside the classroom, all teachers had a similar response. They said they used demonstration and practicals when it was possible to do fieldwork.

Responding to whether or not the basic competencies make the syllabus easier to teach in a learner-centred way, all three teachers responded in the affirmative. They cited the nature by which Agriculture is supposed to be learnt and taught. They indicated that since Agriculture is a practical subject, learners could be assisted in learning it by doing it in a practical way when a particular lesson allows.

According to Teacher D, the learner-centred approach is a good teaching strategy because it involves learners, but it has some drawbacks, especially in rural schools, where they lack resources such as some scientific apparatus and chemicals which could be used in conducting agricultural experiments. Furthermore Teacher D, whilst referring to the same scientific apparatus and chemicals for conducting agricultural experiments, indicated that there is an unequal distribution of the agricultural teaching and learning resources between the urban schools and the rural schools, whereby the urban schools are better equipped than the rural schools.

The teachers were asked to describe the problems they encounter when implementing a learner-centred approach in the teaching of Agriculture in a classroom situation. They all gave different responses to the question, as shown in Table 4.3 below:

Table 4.3: Problems encountered by the teachers when implementing LCA

<i>Teacher B</i>	<i>Teacher C</i>	<i>Teacher D</i>
<i>There are various problems, like some learners do not participate, they cannot communicate they hide among their peers as a result it becomes a bit</i>	<i>The biggest problem for learner-centred approach in our schools is that when you give learners to discuss, the first thing they are going to tell you is that this thing is not in the</i>	<i>The problem that we have in our classrooms as I have indicated is that we don't have enough textbooks, these learners have to share one textbook. You may have 3-</i>

<p><i>difficult to make all of them participate. Also the large sizes of classes make it difficult to make learners participate.</i></p>	<p><i>textbook or this topic is not in the textbook because they always rush to the textbook to get the information and that information is not in the textbook and then as a teacher you try to convince them that some of the things you don't need to use a textbook in order to find answers to them.</i></p>	<p><i>4 learners sharing. So individual attention is compromised as well quality service delivery drops down. The teacher has to walk around and establish among the learners who is participating and who is not.</i></p>
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Teacher B's problem with his learners was that they couldn't participate and communicate, instead they tended to hide amongst themselves and because classes were overcrowded he indicated that this factor exacerbated the lack of learner participation. Teacher C's complaint was that his learners relied very much on textbooks for their learning, they couldn't learn outside the prescribed textbook. Teacher D indicated that the shortage of prescribed textbooks resulted in learners having to share textbooks. According to Teacher D, this situation affected the way the subject was taught and how the learners had to learn it.

4.3.6 General support received or required by the teachers of Agriculture in implementing the senior secondary curriculum

All the three teachers from the sample schools were interviewed regarding the support they received or required in implementing the senior secondary Agriculture curriculum.

(i) In-service training offered and required by teachers of Agriculture

In answering to a question about whether or not they received in-service training, the teachers' responses differed. Teacher B said "*we are not receiving such kind of training but we normally hold 2-3 days workshops to remind ourselves on the teaching*". He went on to say that in 2005 they had an annual workshop, which focused on the implementation of the 2005 syllabus and that most of the grade 12 teachers turned up for it. Responding to the same question, Teacher C said that "*to some extent 'Yes', I think there are a number of workshops on how best we can use our syllabus in a classroom situation. But otherwise, I think it is also the*

responsibility of a teacher, a teacher has to keep on learning otherwise you lose track of the subject".

(ii) Advisory services required and rendered to teachers of Agriculture

Teachers B and C agreed that they have been getting regular support and visits from the Advisory Teacher, but Teacher D did not agree with his two counterparts on this issue. He said that he rarely gets assistance from the Advisory Teacher due to the fact the Advisory Teacher is overloaded with work, because he is responsible for all phases of formal school in the region. In addition to Agriculture he is the Advisory Teacher responsible for Biology in the region even though this year the Biology issue has been resolved.

However, according to Teacher C, who was one of the two teachers who felt supported by the Advisory Teacher, reiterated *"Most of the time the Advisory Teacher is coming here he is concerned with how we are planning daily lessons and how we plan for assessment, especially on the continuous assessments and practical activities"*. Teacher B echoed a similar sentiment when he said that during the Advisory Teacher's visits they always identify curriculum problems and try to solve them together.

(iii) Learner's projects work and teachers' support from the school management

An Agricultural project is one strategy that can provide a learner with both theoretical and practical skills and it needs to be carried out by learners over a longer period of time.

All three teachers were interviewed about how projects in their schools assist in teaching Agriculture at senior secondary school level. Their individual responses differed slightly from one another, as follows:

Teacher B: *"we don't have many projects; we just only have one about chickens...it helps learners know how to manage birds, which is a requirement in the syllabus"*.

Teacher C (from the same school as teacher B): *"we don't have much but this is because us teachers we are lazy...the fault lies with us the teachers but other teachers*

are giving excuses that their schools do not have enough space, maybe in that line one can understand". Teacher C went on to say that, "But otherwise we have a small garden because of lack of space; we also have a chicken unit although we have plans for projects but the space cannot allow".

When asked how these projects assist him in teaching Agriculture he said,

"They are very helpful because most of the topics that we have in the syllabus like 'soils' means by having a garden you can do the practical activities on them without problems. As for the chicken unit is just only there but it is not part of the syllabus".

Teacher D (from a rural school) said "Like last time we had the chicken project but it failed due to insecurity, we have an orchard around here and the school garden, we are busy watering it now". Responding to how it assists him in teaching Agriculture, he said, "Some topics in the syllabus needed to be done outside, for example when you are doing pruning, you have to go to the orchard and do it on the trees outside. If you are teaching soil depth and planting we have to use our school garden".

It is interesting to note that other teachers who worked in the same schools as the teachers interviewed, and officials from the Ministry of Agriculture & Water Development, helped teachers of Agriculture in practical ways. For example Teacher D said fellow teachers in his school assisted him with funds to buy some fruit trees, whilst the Agricultural Department from the ministry donated fruit trees to them.

(iv) Community/Parent support in the implementation of the Agriculture curriculum

Teachers C and D acknowledged the great help they received from the community/parents in assisting them to implement the Agricultural curriculum.

According to Teacher B the community/parents do not support the school in any way to help implement the Agriculture curriculum. He said parents are not helpful and are not even seen at all on the school premises but are only interested in seeing their children pass, and blame teachers when results are released at the end of an academic year. When asked why he thinks the parents are not participating in the school affairs



he simply said, *"They are ignorant, they don't know the importance of their children learning, some of them live next to the school but they will never be seen on the school premises. They don't even check their children's school work, they don't care"*.

Teacher C emphasised his point about the support provided to the school by the community/parents by saying that without the community the school could not survive. He felt one of the biggest contributions the community was making to the school is the provision of the school development fund, which helps the school run its curriculum effectively. According to Teacher C, whenever teachers realise that they are in need of something, with which they think the community/parents can help, for example some manure for the garden, learners are sent out to the surrounding community to go and ask for assistance. Teacher D added to this by saying that currently the community has given the Agricultural Department of the school a big piece of land on which they could grow some field crops and carry out some demonstrations, trials and experiments.

When the teachers were asked how they thought parents could be involved in the implementation of the Agriculture curriculum in schools, they all responded by saying that parents and the community could be supportive through donating items which are needed for the practical learning of their children, such as goats, chickens, land and money to build big agricultural structures, as well as contributing their expertise.

4.3.7 Teaching aids, tools and other equipment

A question was asked of all the three teachers about the availability of teaching aids, tools and other equipment, which assist them in teaching Agriculture at senior secondary level in their schools. All teachers first described the type of teaching aids, tools and equipment available in their schools.

Responding to the type of teaching aids used in their schools, each one of the teachers gave a different response. Teacher B indicated that the type of teaching aids his school uses involved some reference materials, textbooks, syllabus, learners' notebooks and workbooks. Teacher C indicated that the type of teaching aids his learners use are projects such as the chicken unit, gardening and other agricultural tools/equipment which are knapsack sprayers, pair of burdizzo pincers, drinkers and feeders. As for Teacher D, he said that he used textbooks such as 'Agriculture for

All', and 'Agriculture for Southern Africa' (used as a reference text book) as well as an overhead projector and some transparencies, plus videotape and some videocassettes, which are his personal property. It was interesting to note that all the teachers depended not only on the school learning support materials, but were prepared to buy teaching and learning resources for themselves or to make some with their learners.

However, all the teachers indicated there are still some teaching and learning aids lacking in the subject. Teacher B said his school lacks enough relevant textbooks, resulting in 5-6 learners sharing one textbook. He went on to say they also lack some charts since sometimes they are out of stock in local shops. Teacher C said his school lacks some resources on the most difficult topics such as 'farm machinery' as well as a sufficiently large space to establish a small orchard and a patch of vegetables. Teacher D reported that his school lacks charts and posters due to lack of funds. He stressed that with the availability of charts, learners could be in a position to create their own posters.

In the sample schools, fewer resources were mentioned in school X compared to school Y, evidenced by the responses provided by the interviewees.

Teachers also commented on the availability of tools and equipment. They all said that for them, tools and equipment should mean those tools which assist work in the garden, such as spades, digging forks, wheelbarrows, watering cans, sprinklers, shovels, trowels, and rakes. They indicated that these tools are available in sufficient quantity for their learners but they said they still need materials such as books, tools, computers, photocopiers, flip charts and marker pens.

4.3.8 Teachers' views of the barriers to implementing the Agriculture curriculum in schools

In responses to the question about problems and constraints in the implementation of the senior secondary Agriculture curriculum, teachers mentioned the following:

- Lack of support materials and absence of a subject policy document to give guidance.
- Shortage of textbooks for use by the learners.

- Difficulties in the implementation of assessment through use of worksheets, due to absence of photocopier.
- Lack of appropriate and relevant updated reference books.
- Some of the new topics added to the new curriculum are difficult to teach, such as HIV/AIDS and Agriculture, conservation of natural resources, the soil zones of Namibia.

4.3.9 General comments from teachers of Agriculture on the implementation of the Agriculture curriculum at the senior secondary phase

At the end of the interview teachers were asked to give a general opinion regarding the implementation of the Agriculture curriculum at the senior secondary phase. Teachers B and D viewed Agriculture as a practical subject and felt most people consider it to be a very simple subject, but in fact it is one of the most difficult subjects because of the breadth and depth expected by the curriculum, particularly at the senior secondary level.

4.4. Classroom observations

Classroom observations were carried out in order to assess how the selected teachers implemented the Agriculture curriculum in the selected senior secondary schools. The observations made were as follows:

- Five lessons were presented by Teacher B to a Grade 12 class at school X in this order: signs of ill health and health in livestock, health and diseases, infectious and contagious diseases, livestock health, animal nutrition.
- Teachers C and D presented four lessons to Grade 11 learners at schools X and Y respectively. Teacher C presented principles of plant growth and irrigation methods; Teacher D presented soil erosion, soil drainage and water holding capacity.

Information about the teaching strategies used in the lessons were drawn from interviews with teachers, document analysis and class observations. In order to compare how effectively each one of the three teachers used a particular teaching strategy, observations are presented in tabular form in Table 4, which shows the

different types of strategies and indicates how effectively a particular teaching strategy was used by each teacher. Eighteen different strategies were observed.

Table 4.4: Strategies teachers used to teach Agriculture lessons

Teaching strategy	Teacher B	Teacher C	Teacher D
1. Using questions	Often used	Often used	Often used
2. Giving characteristics	Often used	Often used	Often used
3. Learning support materials	Seldom used	Seldom used	Often used
4. Giving examples/using local examples	Often used	Often used	Often used
5. Using familiar vocabulary	Seldom used	Seldom used	Seldom used
6. Explaining	Often used	Often used	Often used
7. Using definitions	Often used	Often used	Often used
8. Providing reality to learners	Not at all	Not at all	Often used
9. Demonstrating to learners	Not at all	Not at all	Often used
10. Giving summaries	Often used	Often used	Often used
11. Planning	Often used	Often used	Often used
12. Involving the learners	Seldom used	Seldom used	Seldom used
13. Providing practical experience	Not at all	Not at all	Often used
14. Making key concepts explicit	Seldom used	Seldom used	Seldom used
15. Promoting learner understanding	Seldom used	Seldom used	Seldom used
16. Development of skills in learners	Seldom used	Seldom used	Seldom used
17. Development of values in learners	Seldom used	Seldom used	Seldom used
18. Assessment of learners' learning progress	Seldom used	Seldom used	Seldom used

The table shows that all three teachers used a number of teaching strategies. These strategies included: using questions, giving characteristics, giving examples/using local examples, explaining, using definitions, giving summaries and planning lessons. However, the table shows that the teachers did not often use some of the teaching strategies, namely: involving learners, making key concepts explicit, promotion of learner understanding, developing learners' skills and values, as well as the assessment of learners' progress. Further to this the table shows Teacher D used more teaching strategies than Teachers B and C. The table also shows that Teachers B and C did not use strategies such as demonstrations and providing practical experience to their learners, whilst Teacher D did use these teaching methods.

The different teaching strategies used and listed in the table above will be described.

Strategy 1: Using questions

This strategy was the most commonly used by all the three teachers. It was used to introduce the lessons and guide learners as the lessons progressed. It was also used to find out how much learning took place and how much the learners still remembered about the previous lesson.

The following gives an example of how each teacher used this strategy in a selected lesson:

Teacher B

Lesson: Signs of ill health and health in livestock (Ruminants & Poultry)

Why do you think it is important to isolate sick animals on a farm? (*Checking previously learned knowledge*).

Yes Betty. (*class management, controlling learner contribution*).

She is saying to keep diseases under control.

Do you agree with her? (*guiding learners, encouraging opinion and application of knowledge*).

Who is saying no?

Yes Mubita why are you saying you don't agree with her? (*encouraging application of knowledge*).

Okay, can you explain further to your colleague what you mean by keeping diseases under control? (*encouraging application of knowledge*).

It is time up please answer it is you who uttered the statement.

So it means you just copied from someone else you can now no longer reflect on it.

Who can help? (*class management, involving learners*).

Yes!

Another one?

Yes Charles.

Okay I want all of you after school to go and find out the answer to the question your colleague asked you do you all understand? (*guiding learning, checking understanding*).

So apart from keeping the disease under control what is another point of isolating sick animals? (*checking knowledge*).

Yes Chaalo?

So you mean animals are only isolated when you want to vaccinate them? (*testing application/understanding*).

Who can further contribute to this?

Yes, Sikabongo?

You say to prevent the spread of the diseases, okay!

What do you mean by saying when you isolate animals you prevent the further spread of diseases?

Yes!

Another additional point, why should we keep on isolating sick animals?

Yes Kalimbula?

Teacher C

Lesson: Principles of Plant Growth

Alright before we get started can we recap what we did yesterday!

We discussed the advantages and disadvantages of irrigation methods.

What are these methods, yes Mundia? (*checking memory of previously taught information*).

Is he correct?

What are the advantages and disadvantages of each one of these methods? (*encouraging application of knowledge*).

Yes Paul, let us start with the advantages and disadvantages of flood irrigation?

Class is Paul correct? (*involving other learners, class management*).

Teacher D

Lesson: Soil drainage and Water retention

Let us revise on what we did yesterday.

Class what did we learn about yesterday?

Yes Lubinda?

Is Lubinda correct class?

This is the removal of water from a field that we want to cultivate. So today we are going to conduct an experiment on 'drainage'. The aim is to find out how much water is drained and how much water is retained, okay?

So the lesson for today is a practical one.

After we have done the 'Aim' in an experiment what follows?

Strategy 2: Giving characteristics

All three teachers used this strategy in their lessons and they combined it with other teaching strategies such as explanations, giving examples, use of learning support materials.

Teacher B

He used this strategy when teaching about what it means for animals to be healthy, and he said:

The characteristics of healthy animals are that they should be able to produce very well, the production will be very high because the mortality rate is reduced, the offspring are not dying, as a result there will be production on the farm. As for birds, they will be laying more eggs and produce more meat

desired for human consumption. When it comes to pigs there must be no issues of abortion and death will be reduced.

Teacher C

He used this strategy when teaching about the characteristics which should support normal plant growth, he said:

Now class I am going to write on the chalkboard those factors which must always be there for normal plant growth and these are: carbon dioxide, temperature, sunlight, water and minerals.

Teacher D

He used this strategy when teaching about the characteristics of three soil samples, namely clay, loam and sand soils. To do this he conducted an experiment in the lesson and instructed learners as follows:

Today we are going to carry out an investigation into three soil samples, namely: loam, clay and sand soils. I will select amongst you some learners who will carry out an experiment in order to find out the water holding capacity and the amount of water which is going to be drained down.

Strategy 3: Learning support materials

Given the availability of resources, this strategy was fully utilised by Teacher D and partly utilised by Teachers B and C. Teacher D used a variety of learning support materials in his lessons such as video tape, charts, textbooks, scientific apparatus and equipment, chalkboard and the school environment, whilst Teachers B and C confined themselves to the classroom and only used a chalkboard and one type of textbook.

The following examples demonstrate the extent to which the teachers used the learning support materials in their lessons:

Teacher B

Today we are going to talk about something else, which is 'Animal Nutrition'. So our focus today will be on 'Nutritional Requirements of animals (cattle). I will draw a table on the chalkboard, which you should complete. I am only giving you 5 minutes to write a nutritional requirement of a cow, calf, bull and oxen.

Teacher C

Good morning class! Last time we looked at plant growth and we also looked at the conditions that support plant growth, what are those class? Yes Ben? Is Ben correct class? Okay class that is correct, I am going to write them on the chalkboard.

Teacher D

Today we are going to carry out an investigation into three soil samples namely loam, clay and sand soils. I will select among you some learners who will carry out an experiment in order to find out the water holding capacity and the amount of water which is going to be drained down.

Now let us come to the worksheets and complete them by answering the asked questions. You have to divide yourself in small groups i.e. of clay, sand and garden loam.

Teacher D when teaching the topic 'soil erosion' showed learners a videotape about the different types of soil erosion and their causes. After showing them the videotape he said "we are going to observe the signs of what we have watched in the video tape outside the classroom and then I am going to ask you some questions".

My observation of teaching strategies used and how these facilitated learner participation was that there was higher learner participation among Teacher D's learners compared to the learners taught by Teachers B and C.

Strategy 4: Giving examples/using local examples

All three teachers often used this strategy during their lesson presentation when they taught abstract concepts to the learners. Teacher B, when teaching the learners about the responsibilities of veterinary officers such as the provision of information to the farmers about disease outbreaks, mentioned the disease anthrax that was very common in their region that particular year. He told the learners that this information given by veterinary officers to the farmers is communicated like other information taking it to the local radio station in order to have it broadcast. Teacher C, when teaching about what the concept 'growth' means, decided to use the example of the biggest river found in the particular region. He asked them the following questions:

Okay do you know the Zambezi River class?

Okay, the Zambezi River in winter the water decreases and in summer it increases, is that growth?

Let me ask you another question, as you are sitting when you stand up would that be regarded as growth?

Teacher D, when teaching about gully erosion and sheet erosion, decided to take the learners around the school premises and showed them the damage caused by these types of soil erosion on the school premises and to the school buildings.

Strategy 5: Using familiar vocabulary

As indicated in Table 4.4 all three teachers in most cases used unfamiliar words in their lessons without finding out whether or not learners understood them. They did so without explaining the unfamiliar words to learners and keeping them simple.

Strategy 6: Explaining

All the three teachers used this strategy fully; each lesson presented to the learners was fully explained. These explanations were sometimes supported with examples. However, conceptual understanding in learners emanating from these explanations was a matter of concern especially with Teachers B and C since their explanations were supported by examples drawn on the chalkboard and from the only reference textbook they used for the subject. Teacher D supported his explanations with a variety of teaching and learning support materials as already indicated.

For example when Teacher B taught about vaccines, sera, antibiotics, antiseptics and disinfectants, he simply wrote these words on the chalkboard and asked the learners to discuss them in groups, then report back to the rest of the class. Thereafter the teacher gave the learners a feedback in form of an explanation to the class. Learners were not shown practical examples or even shown how they should be administered in livestock.

When Teacher C taught the following topics: functions of water in plants; how water moves from the soil into the root hairs; how root hairs are adapted for water uptake from the soil; osmosis; water potential and osmosis, he also just wrote the words on the chalkboard followed by an explanation. There were no experiments or practical demonstrations for learners to observe, get results and finally draw their own conclusions.

Teacher D, when he taught about 'soil drainage and water retention, first explained to the learners what was going to be expected of them in this lesson. He introduced and showed them the apparatus they were going to use in this experiment, led them into the procedures and rules of conducting an experiment, then he let them carry out the experiments, make their own observations, obtain their results and finally draw their conclusions about the experiment. He then concluded the lesson by summarising it for them in form of feedback.

Strategy 7: Using definitions

All the teachers made full use of this strategy because they often provided definitions to introduce and develop concepts in lessons. When teaching about vaccines, sera, antibiotics, disinfectants and antiseptics Teacher B defined them to the learners. Teacher C, when teaching about 'osmosis' and 'water potential' defined these concepts making sure the learners understood them. Teacher D when he taught about 'water retention' and 'drainage' defined the concepts too.

The table shows that none of the teachers fully checked the learners' understanding of the vocabulary and did not confine themselves to using familiar words. The teachers frequently used words which possibly were not understood by many learners, but they did not check whether learners were following.

Strategy 8: Providing reality to the learners

In the lessons observed this strategy was not used at all by Teachers B and C as they confined their teaching to the classroom situation using only a chalkboard and one textbook. Teacher D, however, used this strategy, for example when he taught about the different types of soil erosion. He took learners out from the classroom to the outside environment on the school premises in order for them to see what they had learnt in the classroom.

Strategy 9: Using demonstrations

Teacher D only used this strategy when he was teaching about 'water retention' and 'drainage'. He first of all demonstrated to learners how the apparatus and materials needed to conduct this experiment should be prepared and used, and then he allowed them to conduct the experiment. However, Teachers B and C did not use this strategy since their teaching resources were confined to a piece of chalk, chalkboard and a textbook.

Strategy 10: Giving summaries

This strategy was fully used by all the three teachers; they gave their learners comprehensive and understandable summaries for every lesson taught. The strategy was used to revise, understand and help learners remember what they had learned in the lesson.

Strategy 11: Planning

All three teachers planned for their classroom curriculum implementation. They used the subject syllabus from which they drew up individual schemes of work and these were used to write individual daily lesson preparations (see Appendices 8, 9 and 10).

Planning is vital in the teaching of Agriculture because it a subject which deals with both natural and artificial factors. Some topics in this subject require the availability of natural resources which a teacher may not have control over but can only adapt according to availability and demand. These include climatic and weather conditions which can support livestock and crop production.

Strategy 12: Involving the learners

This technique gave some problems to all three teachers; they did not fully involve the learners in their lesson presentations. As already stated, Teachers B and C based their teaching on the chalkboard and the prescribed textbook with some group work. This means that all the topics they taught were based on theory and the practical part was set aside. Although Teacher D used a variety of teaching and learning resources he selected only a small group of learners to perform the practical aspect on behalf of the whole class.

Teacher B when he taught about 'animal nutrition' decided to put his learners in small groups and said:

I will draw a table on the chalkboard, which you should complete.

I am only giving you 5 minutes...stop now and listen to what different groups have prepared.

Teacher C, when he was teaching about 'water as a transport medium in plants', organised the class into groups and said:

For example a train will transport things from one place to another. So water also does exactly this. It also transports substances within the plant. I am going to write down all the groups' responses on the chalkboard as they are mentioned to me.

When Teacher D taught about 'soil drainage and water retention' he selected only three learners to conduct the experiment on behalf of the whole class. He said:

Yes, now we have the learners who can conduct the experiment.

Can we have them in front please?

Yes give them a hand!

Okay.

This strategy was utilised by Teacher D and not at all by Teachers B and C, as already indicated. Teachers B and C did not use many learning support materials apart from the chalkboard and the textbook. What I observed is that these teachers mostly used a teacher-tell strategy, where knowledge was simply transmitted by word from them to learners.

Strategies 14-18: making key concepts explicit; promoting learner understanding; development of skills in learners; development of values in learners and the assessment of learners' learning progress were partly utilised by all three teachers. More extensive utilisation was not achieved due to the teaching methodologies employed, as described above.

4.5. Document Analysis

Observation of the ways teachers used the content of the syllabi

All teachers were observed with regard to how they used the syllabi in terms of their curriculum preparations. The focus was on how they interpreted the syllabus in terms of the planned schemes of work, lesson preparations and the time allocated to the subject on the school timetable. It was evident that all three teachers taught the subject as laid out in the syllabi (see Appendices 9a and 9b for the schemes of work and Appendices 10a, 10b and 10c for samples of the planned daily lessons). All the lessons described in this chapter can be seen to have been developed from the schemes of work, which are themselves developed from the subject syllabi (Appendices 8a and 8b).

At the end of each lesson each one of the teachers gave homework to their learners and this homework had to be answered in the learners' workbooks. The samples of activities taken from two of the learners' workbooks show that teachers are only assessing learning through information recall, and there is nothing on problem solving (see Appendices 11a, 11b and 11c). For example Teacher B asked his learners to write about *what the nutritional requirements of a cow are before calving*. Teacher C asked his learners to write about these topics:

1. Functions of water in plants;
2. How water moves from the soil into the root hairs;

3. How root hairs are adapted for water uptake from the soil;
4. Osmosis and water potential.

Teacher D asked his learners to write *about the type of erosion that is observable in their environment*.

4.6 Conclusion

In this chapter I have reported on my findings of how the selected teachers implemented the Agriculture curriculum in their respective senior secondary schools. Guided by my research questions, I reported on the following issues:

- The contextual analysis of the participating schools.
- The background information of the teachers interviewed at two sample schools.
- Teachers' perceptions of the relevance of the Agriculture Curriculum.
- Teachers' understanding of the goals and objectives of teaching Agriculture.
- Teachers' use of the syllabus and guides of Agriculture.
- Methods applied in teaching Agriculture in and outside the classroom situations.
- General support received or required by the teachers of Agriculture in implementing the senior secondary curriculum.
- Teaching aids, tools and other equipment needed to teach Agriculture.
- Teachers' views of the barriers to implement the Agriculture curriculum in schools.
- General comments from the teachers on the implementation of the Agriculture curriculum at the senior secondary phase.
- Classroom observations
- Document analysis (syllabus, scheme of work, lesson preparation and learners' activity workbooks).

As I presented and analysed my findings a set of themes emerged, which will form the basis of the next chapter.

Theme 1: The role and value of agriculture in the school curriculum.

The focus of this theme is based on the benefits the knowledge of Agriculture as a subject has for learners.

Theme 2: Facilitating Agriculture in the senior secondary school.

The theme here looks at how best Agriculture can be taught in senior secondary schools in order to achieve the intended learning outcomes of the curriculum.

Theme 3: The systemic issues related to the structure and function of the two schools.

Here I will consider how the time allocated to Agriculture on the school timetable is implemented in order to benefit the learners. Further to this I will consider the allocation of infrastructure and other learning resources to the subject as well as the ability of learners taking the subject.

Theme 4: Issues that arose in relation to the relevance of Agriculture as currently taught in the two schools.

In this theme I will consider how the Agriculture curriculum is currently taught in the selected schools, with reference to the availability of teaching and learning resources. The aim is to provide both theory and practice to the prospective learners. Both the academic and professional competence of the teachers will be considered, as well as the communication skills and language proficiency of the learners.

Theme 5: Lessons learnt from the study.

My research to date has identified a number of key issues which were not apparent at the outset of the study. This theme will explore the knowledge gained to correct misconceptions or consolidate perceptions about the implementation of the Agriculture curriculum in senior secondary schools.

DISCUSSION OF FINDINGS

5.1. Introduction

In the previous chapter data was presented which described how the three teachers involved in the case study implemented Agriculture in the two selected senior secondary schools in the Caprivi Region. In this chapter the emerging issues will be discussed further in the light of the literature reviewed in Chapter 2.

The chapter discusses and evaluates the following themes:

- The role and value of agriculture in the school curriculum,
- Facilitating Agriculture in the senior secondary school,
- The systemic issues related to the functioning of agriculture in the two schools,
- Issues that arose in relation to the relevance of Agriculture as currently taught in the two schools, and
- Lessons learnt from the study.

5.2 The role and value of agriculture in the school curriculum

As shown in the discussion relating to the reform policy (Chapter 2), the incorporation of Agriculture into the school curriculum was based on the needs of the society of which the learners are part. A similar idea is supported by Elliot et al. (1985:iii) when they stated:

Agriculture is the basic industry. Every country relies on it to feed its population and to support its economy. There is an overwhelming case for making Agriculture a part of every school curriculum.

Agriculture, therefore, was incorporated into the curriculum because of the many benefits it has for learners. Some of these benefits include equipping learners with relevant skills and knowledge which will help them be self-employed or secure

employment in the public sector. Ultimately this could lead to the alleviation of hunger, poverty and disease amongst the population. In addition an important reason for including Agriculture into the curriculum is to provide essential scientific background for the learners with the hope of producing much-needed scientists and agriculturalists for the country (Muyunda, 2006:4).

The views expressed by the participants about the role of agriculture coincided with those of Muyunda, Mashebe and others (Chapter 2). In developing economies such as the economy of Namibia, Agriculture points the way to improving food production and it offers a practical solution to many development problems (see Chapter 2). Muyunda, Mashebe and others further stated that agriculture provides employment, income, food, raw materials and foreign exchange to the nation. It is for these reasons that the inclusion of Agriculture in a school curriculum can help to lay the foundations upon which to build other aspects of national development.

Only through the study of agriculture at senior secondary school level will these learners be provided with learning opportunities that can help them to be equipped with the necessary agricultural knowledge, skills and attitudes that could assist them enter related tertiary studies or the world of work (Namibia. MBEC, 1998). The revised Agriculture senior secondary school syllabus, introduced in 2006, was drafted with this objective as indicated by the following statement: "The main objective of the syllabus is therefore to equip learners with necessary knowledge, skills and attitude that will enable them to enter tertiary education or the world of work" (Namibia. MoE, 2005:2).

Based on the very positive views expressed by the three participants in this study about the importance of Agriculture, it would seem that they concurred with the authors who emphasised the need for agriculture in the modern school curriculum. However, as the results show, these positive views do not appear to be translated into practice given the type and number of the facilities present at the two schools.

According to the Namibian Education Policy, agriculture is regarded as a pre-vocational subject because it puts emphasis on preparing learners for both higher education and the world of work (Namibia. MEC, 1993; Namibia. MBEC, 1998). This means that Agriculture as a pre-vocational subject should emphasise practical work as an integral part of the course (Namibia. MBEC, 1998:2). In other words these

learners should not only be engaged in theoretical skills but they should also be engaged in food production and in acquiring business skills in the subject.

In this context as seen by the literature reviewed the learners should be exposed to all the practical aspects of the subject. These practical aspects include livestock production, crop production, farm machinery, farm infrastructure and farm management. Agriculture as a pre-vocational subject, according to the Namibian educational policy, should ensure the all-round development of the learner, which should equip them for life (Namibia. MBEC, 1996:5). The practical and theoretical skills these learners acquire from this subject can and should help them be self-reliant.

The situation at the selected schools was, however, such that the possibilities for practical hands-on activities were limited to gardening only. None of the three teachers talked about Agriculture as a discipline which comprises many branches. It was also apparent that when the teachers referred to the type of agricultural tools and equipment that they used during agricultural practicals, they mostly referred to the ones that they used in the garden, such as spades, digging forks, wheelbarrows, watering cans, sprinklers, shovels, trowels and rakes. Even so they indicated that these tools were not available in sufficient quantity for their learners.

This aspect was also highlighted in the interviews. Teachers said that their schools lacked most of the relevant teaching and learning resources such as current textbooks, tools, equipment, computers, photocopier, flipcharts, marker pens, laboratories and some scientific agricultural apparatus and chemicals. This means that the pre-vocational dimension of agriculture is severely compromised.

As was seen from the lessons observed, the primary source of information was the textbook; teaching and learning were primarily determined by what was in this resource. Little or no attempt was made to adapt the textbook knowledge to the learners' own situations. In his critique of teachers who relied heavily on this type of teaching approach, West (1995:23) stated, "Teachers whose subject knowledge is inadequate tend to rely too heavily on the textbook and tend to discourage learner initiative". The analysis of learners' work also revealed over-reliance on the text books as most of the written work was a regurgitation of facts contained in the prescribed textbook.

Based on the information gathered from the schools and from the teachers' responses to the interview questions, it is uncertain whether the pre-vocational aspect of Agriculture is being achieved at these two schools. Further to this there was little or no evidence to demonstrate the role of agriculture as an applied science or as a preparation for entrepreneurship during the teaching and learning sessions.

Agricultural skills are relevant to all types of learners regardless of the socio-economic environment they are found in, be it in semi-urban, urban or rural areas. As already outlined (Chapter 2), agriculture consists of different branches which are adaptable to most environmental settings. Therefore the Agriculture curriculum for these learners should have been contextualised according to the environment and location of their schools.

This means that there was little justification for the reasons put forward by the teachers as an excuse for failing to teach the learners, agricultural skills based on the environmental locations of their schools. In order to have addressed these obstacles to implement the Agriculture curriculum, teachers could have adapted the practical dimensions of curriculum according to the environment in which their schools are located.

Agriculture is also regarded as an applied biological science because it cuts across the natural sciences such as chemistry, physics and mathematics (Dejardin et al.; Mujuni, 1998; Van Harmelen, 2004; Namibia. MoE, 2005). In addition Agriculture draws ideas from physics, chemistry, mathematics and biology for its practical applications. Further to this, "Farming is an applied science because farmers make use of scientific knowledge and experience to get the best from their environment and natural resources" (Kay, 1996:8).

Therefore learners would learn more about agriculture if they were subjected to some scientific and mathematical training. Current trends in Agriculture require learners who are exposed to scientific and mathematical aspects. Teachers who have accepted change in teaching science subjects, of which Agriculture is part, are commended for this:

Many teachers have changed their approach when teaching science from teaching an accumulation of facts about science, to teaching with an emphasis on helping learners

understand the exciting process and skills that scientists use to explore and investigate the world around them.

(Namibia. MEC, 1995:3)

For example when we talk about pests, diseases, fertilisers and transportation of the farm inputs and farm products all the mentioned science subjects are implicated. For example pesticides are chemicals which can be used in order to kill pests in one or more of many ways. This means that a pest can be attacked by a pesticide either through the digestive system, smell or by contact, therefore the correct measurements of mixing a pesticide with water must be followed in order to yield the desired results. An example drawing on mathematical understanding might be transportation of the farm products which require some machinery for specified calculated loads. Tools and equipment used on a farm need to be maintained properly, this brings in other scientific knowledge and skills.

These examples illustrate the need for knowledge of mathematics, biology, physics and chemistry. Despite the fact that topics requiring the use of the outlined natural sciences were included in the senior secondary school syllabus, the teachers in the study did not show learners how these subjects are integrated in Agriculture (see Appendix 6).

Agriculture also requires the knowledge of business economics and accountancy. Muyunda (2001:64) put forward this idea, when he stated in his research that many people view agricultural education as a business enterprise. If the learners had acquired agricultural skills in food production, they could produce food on a larger scale and later sell the surplus and earn an income like any businessperson. Kay (1996:8) adds to this by stating, "Farming is a business because, whether you are farming for subsistence or farming for profit, you want to obtain maximum yields for minimum costs".

The aim is to make a profit and make effective use of resources; therefore with a knowledge of business oriented subjects such as business studies, learners could learn how to minimise losses in agricultural production and also learn how to make a profit.

The lessons observed in the two schools did not include practical work which involved Agri-Business skills. Learners would acquire these skills if their teachers engaged them in learning about food production and marketing of agricultural

products. Thus this approach would help them understand when they would be making a loss or a profit on their agricultural produce. This situation was confirmed by examination of the learners' notebooks and activity books. There was no indication of learners having been exposed to farm accounts that dealt with the farm sales and inputs. In addition, it was clear during visits to the schools that the two schools did not even have agricultural projects which could help learners practice and acquire some Agri-business skills.

5.3 Facilitating Agriculture in the senior secondary school

Agriculture being an applied biological science subject is best taught and learnt when theory and practice are combined together. In order for it to have qualified as an applied biological science subject in the two schools, it should have been taught both inside and outside the classroom situations.

Agriculture cannot be taught or learned in a classroom only. The motto of the good Agriculture teacher is, "show them how; let them try; tell them why" (Elliot et al., 1985:iii). This means that these teachers should have employed many teaching and learning strategies which could help facilitate effective learning and teaching to take place.

The Broad Curriculum (Namibia. MBEC, 1998:2) as indicated in Chapter 2 suggests that "teachers [should be] encouraged in order to link theory and practice, to use a practical approach in teaching the subject" and that "learners learn best when they are actively involved in the learning process through a high degree of participation, contribution and production" (Namibia. MBEC, 1998:9). Thus Nott (1995:8) claimed that "Lessons should be planned in such a way that the learners are actively involved throughout the lesson". I expected to see the teachers encouraging learners to take part in discussions, experiments, group activities and practical work. I also expected evidence of teachers' ability to select content and methods on the basis of a shared analysis of the learners' needs, as well as their ability to adapt the curriculum to the local environment of the learners (Namibia. MBEC & Namibia. Ministry of Higher Education Vocational Training Science and Technology [MHEVTST], 1998:2).

While the participating teachers in the two schools used group-work, debates, lecturing, and the question and answer method as well as demonstrations in the

classroom, the evidence revealed that these strategies were often used in a technical rather than in a reflective or problem-oriented manner. Of the lessons observed as part of the study, Teachers B and C in school Y did not use demonstrations leading to practical application.

The observed lessons affirmed West's (1995:23) critique that while

There are teachers who have admittedly been involving their learners in group work and projects, but we need our teachers to be able to capitalize on the knowledge, insights, and interests of their students and to involve them in planning the work they are going to do.

The way that agriculture was taught in the selected schools did not appear to affect the learners in any way, rather they were subsumed by the curriculum, the textbook and the demands of the examination, that is, the theoretical rather than practical focus of the majority of the lessons observed.

The teaching approaches actually used by the teachers to teach Agriculture contradicted the responses given during the interviews. In the interviews these teachers emphasised Agriculture as a practical subject, requiring learning through doing or hands-on activity. They further claimed that the basic competencies which were included in the new syllabus helped them to teach the subject in a learner-centred way, but this was not seen to be the case.

A further example of the problems identified in the facilitation of the agriculture at the senior level related to agricultural projects. All the teachers mentioned agricultural projects which assisted them in teaching the practical application of Agriculture practically. However, despite this claim there was no evidence of any project in the schools which was relevant to the teaching and learning of Agriculture in the context of the syllabus demands.

One other shortcoming observed was that the subject was taught without the benefit of well-equipped laboratories. This is an unfortunate situation if the country's vision of 2030 is to be realised by these schools. As Woolnough (1991:13) indicated, "The laboratory offers many more opportunities for satisfying natural curiosity, for individual initiative, for independent work, for working in one's own time and obtaining constant feedback regarding the effects of what one has been doing". It is only through quality education that the reform vision can be realised by Namibia.

Quality education, among other things, means these schools ought to be equipped with learning and teaching resources that make these ideals obtainable.

A learner-centred approach demands teaching strategies that can lead into a deeper conceptual understanding in a learner about what is being taught and learnt. These are the strategies which focus on the holistic development of a learner. In the two schools studied as part of this research it was problematic for the teachers to effectively implement the learner-centred approach because they lacked teaching and learning resources, such as scientific apparatus and chemicals, which could be used to conduct experiments.

Visits to the two schools revealed that they did not have access to farms, laboratories, farm machinery, farm infrastructure and other related agricultural implements, which could be used for practical purposes. Therefore agricultural infrastructure and resources which currently are lacking in these schools could play a pivotal role in addressing the demands of the broad curriculum, which emphasises a link between theory and practice.

While these are recognised as contributory factors that limit the implementation of practical work, it was felt that through the application of an investigative approach to teaching and learning as suggested by policy learners could have been exposed, if only peripherally, to the practical issues of farming in their region (Akinsanmani, 1975; Schekman, 1984).

School Y, being a rural school, enabled teachers to conduct some practical activities for their learners on the local community's fields. The farmers in this community are mostly subsistence farmers. The question then arises about the effectiveness of learners gaining the desired curriculum skills and knowledge from these farmers since the farmers produced their agricultural products in a traditional way.

The reality is that the knowledge and skills of food production gained by the learners through working alongside traditional farmers is limited in scope and has hindered them in being creative and innovative in their thinking abilities. These aspects must be seen as factors contributing to the problems of presenting agriculture according to the reform ideals.

On a more positive note, however, the teachers indicated that the Ministry of Education's regional office, together with the central Ministry of Education, do organise in-service training for them in order to update their teaching skills.

In-service training is of additional benefit in bringing all the practising teachers together and helping them to learn from one another. Certain topics on the syllabus as indicated are seen as quite difficult and are often misunderstood by individual teachers, but when teachers come together they can share ideas with one another and will be in a position to learn from one another. Information and knowledge sharing usually comes to the fore in such gatherings.

They also said the workshops which were provided by the Ministry of Education gave them chances to update and upgrade their teaching skills. If teachers are assisted by the government through holding workshops in this subject, then workshops should be used regularly in order to assist them. Knowledge and skills are not static in nature but they keep on changing according to time and space, hence the need to constantly provide teachers with in-service training (Kay, 1996; Van Harmelen, 2003). In-service training puts teachers in a position to pass on to their learners some correct and updated knowledge, information, values, attitudes and skills.

5.4 The systemic issues related to the structure and function of the two schools

Other factors contributing to the problems of implementing agriculture in the school context included a number of systemic issues.

The allocation of periods on the timetable to Agriculture (see Appendices 15a, 15b and 15c) was one of the crucial issues in these schools. The teachers complained about insufficient time to combine theory and practice in teaching Agriculture. According to them, whenever they came across a topic which demanded both theory and practice, they would split it into two components. Firstly, they would teach the theory part of the lesson in the allocated period, then they would arrange for a practical lesson some time in the afternoons, after school.

However, the teachers complained about this arrangement because it inconvenienced other subject teachers who wanted to give extra lessons to the same learners at the

same time. They also stated that it was not only teachers who were inconvenienced by this arrangement, but learners too were inconvenienced. This happened in two ways.

Firstly, they were expected to do their homework in other subjects and the appropriate time for them to do this was during the afternoon after school. This was also the time they were expected to turn up for their Agricultural practical lessons. The subject clashes which were caused by this time arrangement, created nervousness and anxiety in the learners such that their learning was disturbed.

Secondly, was the problem of tiredness and boredom. According to the teachers, whenever the learners turned up for the extra lessons in the afternoon, they seemed not to concentrate on what was going on during lesson time since their energy and interest were already exhausted by the subjects they attended earlier in the day.

Referring to the learners' interest in learning and understanding of what the teacher taught them in the classrooms, Hinchey (1998) stated that because students need to build their own understanding of information and ideas, their interests and experiences are very important to classroom life. This showed that these learners' interests in learning were disturbed because of the boredom and tiredness emanating from attending extra classes in the afternoons. It appeared that little or no learning took place in these schools in as far as Agriculture practical lessons were concerned if the arrangement was to teach in the afternoon.

To expand on the previous paragraph, I found that whenever the learners were asked by their teachers to come back to school for the afternoon practical lessons, they had already exhausted their energy, and had little interest in learning during the lessons they undertook in the afternoon. Forcing them to attend what are essentially extra lessons was seen as a form of punishment and could result in their disliking the subject and possibly even hating the teachers who taught it.

The period allocation for Agriculture on the timetables of these schools was also a matter of concern. Instead of allocating double periods weekly for this subject each time it appeared on the timetable, other days of the week were allocated a single period (see Appendices 15a, 15b and 15c). It is unlikely a single period could accommodate both theory and practice in the same lesson if the intention was to give quality education to the learners. Double periods would have been more appropriate

in order to teach both theory and practice. This could have assisted these learners to make connections in their mind about what they learnt theoretically and what they learnt practically.

As already indicated, the schools did not seem to attach great importance to Agriculture. This was evident in the manner the schools allocated infrastructure teaching and learning resources to the subject. The status of the subject was further compromised by the fact that low achievers and middle achievers are encouraged to take this subject as an easy option. The motive behind this is that Agriculture, as a pre-vocational subject, was viewed as an easy subject that any learner, regardless of their level of intelligence, could learn without problems.

In clarifying the perception of people about subjects in the same category as Agriculture, Mannel (1995:133) stated that "The perception that technical and vocational education is meant for the 'not-so-bright', is engraved in the minds of many parents and learners".

Added to this is the fact that the Agriculture teachers themselves did not regard the subject as a natural science subject as other teachers in the same schools teaching Physical Science, Biology and Mathematics, because it was not equated with other natural science subjects in terms of priority in the school curriculum.

This was reflected further by the fact that in neither school was agriculture provided with specific classrooms or laboratories, instead teachers and learners used those that were provided for physical science and biology. According to Burger & Schwarz (1993:68), "In a high school each subject should have its own classroom in order to provide an atmosphere appropriate to the subject. This is especially important in the case of Agricultural Science, where the classroom should be stocked with pictures, specimens, unfinished experiments etc."

5.5 Issues arising in relation to the relevance of Agriculture as currently taught in the two schools

Given the above issues raised in respect of the pre-vocational value of agriculture in the two schools, the relevance of the subject must be considered. Although the three teachers when interviewed were able to identify the relevance of Agriculture and affirmed the views of Mashebe about its importance in a largely agrarian society, the results reveal (as indicated above) the lack of laboratories and practical application reduced the relevance of Agriculture as an applied science.

So too the notion of Agriculture as a means of developing self-sufficiency or entrepreneurship was not achieved. Further to this the learners through their study of Agriculture had no opportunity to examine or to explore alternative approaches or to apply and use Agriculture in their own contexts, as the textbooks promoted the traditional notion of Agriculture.

The problem of relevance is further highlighted by considering the generally narrow view of a learner centred approach and how this was implemented by these teachers. Referring to problems experienced in implementing a learner-centred approach, Teacher C alluded to the heavy reliance by learners on the use of textbooks for information. This point is of great concern. During visits to these schools, it was apparent that all three teachers contributed to this problem. Most of their teaching was confined to the use of the chalkboard and the prescribed textbook

In defence of teaching this subject in this way the teachers cited the following reasons:

- Lack of support materials and the absence of the subject policy document to give them guidance.
- Shortage of textbooks to control learning and teaching activities.
- Implementation of assessment through the use of worksheets due to the absence of photocopiers.
- Some of the new topics added to the new curriculum were most difficult to teach, such as the HIV/AIDS and Agriculture, Conservation of natural resources, the soil zones of Namibia.

Regarding the shortage of textbooks in the schools, as mentioned by the teachers, a similar dissatisfaction was noted by Swart (1995:13) when she stated, "A big problem experienced by learners in almost all regions is the lack of textbooks. Most schools make do through sharing until full supplies arrive".

Further to this they indicated the following as some of the problems encountered with learners when implementing the learner-centred approach in the classrooms during lesson time:

- learners could not participate during lesson times because of the language problem,
- the less able learners hid themselves amongst the able ones making it difficult for all of them to participate, and
- the large size of classes made it difficult for all the learners to participate during lesson time.

Responses given by these teachers fell into two categories: Firstly the problem was seen as being created by the teachers themselves. Many of the Namibian teachers, regardless of the subjects they teach, are still handicapped in terms of the effective implementation of this paradigm shift and do not understand what it entails.

This claim is supported by the National Institute for Educational Development (2003:27), when it stated "Since only a minority of teachers have been thoroughly grounded in learner-centred education, it will be necessary to guide the teachers in learner-centred methodology". Further to this, "from the learners' point of view, learner-centred approaches are becoming more widely used, but that certain features of it are not clearly implemented or understood as yet" (Swarts, 1995:13).

Relevance was further reduced when observations of the teachers showed that they were unable to help the learners' understanding, either using teaching methods which did not seem to assist their learners at all or language that the learners could not access. Such circumstances created a communication breakdown between the teachers and their learners in the learning and teaching situations. On this basis teachers should be urged to follow the idea of Etchberger & Shaw (1992:3) when they stated, "Teachers must constantly be aware of what knowledge base each individual student has and must use this information in planning and implementing the instruction".

The language which the teachers used at times during the learning and teaching sessions reduced communication, as certain concepts of the lessons were not explained and made explicit to the learners. Observations indicate that this situation seemed to have frustrated some of the learners during lesson times, as a result of which they decided not to participate in the lessons. For Vygotsky the focus in teaching is not on transferring skills from those who know more to those who know less, but on the collaboration, the social interaction, to create, obtain and communicate meaning (Vygotsky in Cole & Scribener, 1978).

Learning would also have been enhanced if the prior knowledge of the learners had been used during lesson times. In support of this idea, Piaget argued that knowledge is constructed as the learner strives to organise his or her experiences in terms of pre-existing mental structures or schemes (Piaget in Bodner, 1986). From what I gathered during lesson observations these teachers did not use the learners' prior knowledge constructively, they simply asked them few questions on a superficial level at the beginning of each lesson, nothing more.

In support of this point of view, Nafziger (1998:62) stated, "Constructivism...says that knowledge is best acquired through learning experiences that are connected to things the child already knows, that engage the child socially and emotionally, and that harness the child's natural curiosity to the task at hand".

These learners when observed seemed not to have had much of a problem on the few occasions when their prior knowledge was included. However, they had problems when it came to learning new things about the subject. Therefore the home and family background should have been used to complement what the learners discovered at school and what they already knew. In a learning and teaching situation, a learner should be in a position to easily make connections with what has to be learnt and that he or she knows in order to learn something sophisticated but in the same line (Nafziger, 1998).

5.6 Lessons learnt from this study

One most important lesson that I learnt from this study was that there has not been enough research conducted on the implementation of the Agriculture curriculum in

Namibian schools. So far there is only one case study that was conducted by Muyunda in 2001 and the focus was on two junior secondary schools in one region. This meant that Muyunda's findings and tentative suggestions about his study could not be generalised to other schools in the same region or to the other twelve administrative regions of Namibia.

Muyunda's approach and my approach are the same except that he focused on the junior secondary school level and I focused on the senior secondary school level, and he had four research participants and I had three. Compared to Muyunda's study I realised that I should have involved the learners and the Regional Advisory teacher to be part of the study and perhaps this would have assisted me in gathering richer data which could have made a difference in the knowledge and understanding that I gained.

Further to this I learnt just how teachers struggle to promote effective learning and teaching when they lack the necessary teaching and learning resources. These shortcomings also affected the learners' performance in the national examinations (see Appendix 16). This means that these results are not a true reflection of the learners' mental capability in the subject.

In this study all three teachers claimed that they were not in possession of important subject documents such as the subject policy and the broad curriculum as they were in the custody of their principals. This made me realise the importance of including these documents in professional development workshops for the in-service teachers as well as the need for these policy documents to be part of the pre-service teacher education programmes.

As indicated in Chapter 4, there was a difference in opinion in the role of the community in supporting the teaching of agriculture. A valuable lesson here is how important it is not only to gain the help and support of the community to ensure that some practical application is possible, but also to have the sort of relationship with the community that allows the learners to question and challenge traditional farming measures through the adoption of an enquiry approach.

It is the responsibility of the teachers to educate the community about the partnership which exists between the teachers, parents and learners, regarding the education of a

child. A similar sentiment was echoed by Elliot et al. (1985:iii) when they stated "The Agriculture teacher is a key figure. He fulfils an important role in the community".

Another lesson that I learned in this study was that the aims and objectives of the Agriculture syllabus seemed not to have been well understood by these teachers when it came to the actual implementation, even though during the interviews all the teachers claimed not to have had any problems with them. It is advisable that the stated objectives and goals of education reforms and its implementation should be not only be simplified to enable these teachers understand them in their lesson preparation, but that they be articulated in ways that enhance their application (Muyunda, 2001).

Another important lesson that emerged from this study was the disjunction between the ideals underpinning the inclusion of pre-vocational subjects in the school curriculum and the actual achievement of these ideals. Not only was there a serious lack of agriculturally oriented teaching and learning resources in these schools, but I did not see laboratories specifically allocated for the teaching and learning of Agriculture, instead the teachers taught the subject in ordinary classrooms. This suggests they did not have the necessary scientific apparatus for conducting Agricultural experiments. Agriculture, being an applied biological science subject, requires the use of experiments in order to assist learners to learn better. In most cases these experiments need to be conducted in laboratories.

In addition the teachers indicated that they still needed materials such as books, tools, computers, photocopiers, flip charts and marker pens. This indicates that the schools did not have sufficient and relevant teaching and learning resources which would have helped them give quality Agricultural education to their learners. Furthermore I learnt that for them, practical agriculture meant gardening and the tools they needed to teach practical agriculture were confined to gardening.

All of this raised questions about the costs involved in providing for pre-vocational subjects. These teachers referred to only small amounts of money made available to purchase simple resources such as seeds. They did not talk about money to purchase some of the most needed inputs and chemicals which could be used in field crop and livestock production. They also did not mention agricultural equipment which is necessary to teach practical agriculture in schools.

Whilst appreciating the way the subject has been taught in the past, there is a need for teachers to change according to the demands of our current educational system. "Many of the teaching techniques used in the past are valuable but there are many new ways of helping pupils to learn" (Parkinson, 1994:1). However, Agriculture as a pre-vocational subject should not only depend on the subject teachers. There must be some additional support coming from the respective school management systems to assist teachers to better implement the curriculum.

What this study also did was to highlight the systemic factors that are contributing to the problems of implementing this subject according to the reform ideals. Thus, the teachers alone are not to blame, and in fairness I felt that these factors too need to be taken into consideration when analysing the future of Agriculture in the formal school curriculum.

5.7 Conclusion

This chapter gives an account of the research data and its analysis. In trying to understand what this data meant to me, I compared the respondents' responses to the interview questions with how they actually implemented the Agriculture curriculum in their schools. To do this I considered many factors such as the teachers' teaching strategies, learners' learning strategies, the type of learning and teaching resources that were available in the schools.

Thereafter I have compared my findings with what the Agriculture subject policy document suggests regarding the implementation of this subject in schools. In order to present a more informed picture of the data I have consulted literature to verify my findings, and compared my perceptions and experiences regarding the most acceptable way the Agriculture curriculum is supposed to be implemented in the schools.

CONCLUSION

6.1 Introduction

This chapter provides a critical reflection of the research process and the research findings. In reflecting on the study, I also include some of the key lessons learned and on the basis of these make some tentative suggestions about future research needed in the area and about the possibilities that this small scale study has opened up for my work and that of my colleagues. This chapter is structured as follows:

- reflection on the envisaged need to do the study and why I feel I have achieved the aims of having conducted the case study;
- identification of the key issues and concerns that the results presented;
- identification of the main positive aspects that the research revealed;
- making tentative comments about some of the contributing factors that led to the result;
- identification of lessons learned about the methodology, and then;
- making very tentative suggestions about the ways to address the concerns.

6.2 A reflection on whether the aims of the study were achieved and how well

The study enabled me to have a better sense and understanding of how these particular teachers viewed and implemented the Agriculture curriculum at senior secondary school level in their schools. Based on the knowledge and understanding that I gathered from this study and considering the nature of my job as an Advisory Teacher for this subject, I am of the opinion that I will be in a better position to support and give helpful advice to Agriculture teachers in as far as the implementation of the Agriculture curriculum in their schools is concerned. As a former teacher educator I also believe that I have learnt a number of valuable lessons that I may be able to share with my former colleagues.

6.3 An overview of the research process

In this case study the interpretive orientation helped me to gain insights into the implementation of the Agriculture curriculum in the two schools which would have been impossible if I used a questionnaire or a survey. I also believe that by using multiple data collecting instruments I was able to not only make better sense of the research context but to provide a far richer and hopefully more credible account of the area being investigated.

The qualitative emphasis of the study made me more sympathetic to the problems of the participating teachers as I was better able to see their teaching in relation to the contributing factors leading to their situation. Notwithstanding the empathy I felt for these teachers, the classroom observation techniques I used provided a picture of teaching and learning that opened my eyes to issues that I might otherwise have glossed over.

Of particular concern to me throughout this process were the discrepancies that the study revealed between teachers' apparent understanding of the reform deals and the new curriculum and the reality of their practice.

6.4 The key findings of the study

This section provides an overview of the main findings of the research. My first concern in the findings was that the curriculum was not fully implemented as certain sections were neglected: these included the required practical work, aspects of the applied science, and agricultural mathematical calculations, as well as aspects of agribusiness. These sections were either done superficially or left out all together.

In addition since few of these learners take any of the science subjects as part of their grade 12 programme, the subject combinations which were taken by most of the Agriculture learners would not allow them gain admission to agricultural tertiary institutions.

However, it must be stated that the contributing factors that led to this situation in these schools were a lack of resources and amenities, as indicated in Chapter 4. These two schools lacked laboratories, agricultural scientific apparatus and farms that could

be used for practicals and experiments. Therefore, if we are serious about pre-vocational subjects we must be expected to implement them as such.

The key issue I feel was very important in providing me with insights about the teaching of Agriculture, which went beyond other studies, is insights into how these teachers approached learner-centred education. The biggest issue here was how the teachers interpreted learner-centred education and how they internalised what it means, consequently the focus on the lessons I observed was more on factual information than on the conceptual understanding, or on the development of values, skills and attitudes. A third set of insights which I consider to be particularly important related to the notion of relevance in terms of the subject.

This focus provided me with an understanding of how important it is to adapt the curriculum to the learners' own environment, of the importance of using prior knowledge well and of keeping the learners' needs in the foreground rather than focusing only on the demands of the examination. I realised through this study just how we reify the curriculum at the expense of the learners. I also was able to recognise the importance of interactive and participatory approaches as a means to make meaning and consequently as a means to increase the relevance of the subject.

Other insights including the use of resources were valuable and I came not only to understand what resources were used and how they were used but also why they were used.

The other key findings were the issues raised by the teachers regarding the systemic problems they faced. This included lack of support and advice from the school management teams and the Regional Education Office, problems related to time tabling and the time allocation for the subject. Above all they complained about not having access to the subject policy document as it was kept in the offices of the two principals.

The generally poor status of Agriculture was, for me, one of the really serious issues that was raised, along with the factors contributing to the problems of implementing the subject in line with the reform goals. I found this particularly worrying given the emphasis placed on agriculture for Namibia's continued well-being and economic stability.

6.5 The key issues raised by the study

In this section I identify what for me were the key issues raised by this study. These for me represent the value of the study, because through this study I was able to come up with the strengths and weaknesses that portrayed how these teachers implemented the senior secondary Agriculture curriculum in their two schools as well as coming up with tentative suggestions that could perhaps redress the envisaged shortcomings as indicated in the study.

One most important issue emerging from this study was how these teachers acquired their teaching qualifications. None of them had an Agricultural Education qualification that was obtained either at diploma or degree level. This scenario could be attributed to the fact that Namibian tertiary institutions do not offer this course in the faculty of education.

Following these teachers' complaints about the difficulties of implementing the Agriculture curriculum as expected, was an indication that they relied considerably on the school management team, the Advisory Teacher and the Regional Education Office for assistance to implement the subject for the benefit of the learners. According to Gray (1995:5) teachers of Agriculture should become increasingly and significantly involved in the designing and delivering of in-service training courses and workshops by making use of peers as role models.

Based on what I saw from these teachers I think they needed more support in terms of how they could incorporate both theory and practice when handling a particular topic or lesson that demanded to be taught in such a way. In order for these teachers to teach Agriculture as a pre-vocational subject, the teaching and learning resources, as well as other basic amenities as indicated in Chapter 4, should be made available in these schools. Where this is not possible for any reason these teachers will need to be supported in learning to adapt and to innovate to enhance the teaching and learning of the subject.

The issue of support for these teachers points to the need for the school management teams of these two schools together with the regional Advisory Teacher to assist these teachers with the implementation of the learner-centred approach. They could do so

by assisting them to come up with lessons that focus not only on factual information but that incorporate conceptual understanding, values, skills and attitudes.

Further to this, the school management teams together with the regional Advisory Teacher could help these teachers set aside a designated space in the schools that could be used for the storage of agricultural apparatus and display of the agricultural specimens as well as being used to conduct some agricultural experiments. This approach could show everyone who is in these schools and those who come to visit the schools that Agriculture is one of the science subjects that are taught in these schools.

Essentially these and other issues emerging from this study raise questions about how serious Namibian education is about not only Agriculture but all the pre-vocational subjects offered as part of the formal curriculum.

6.6 Limitations

Given the nature of this research as a small scale case study, the research findings cannot be generalised to represent all the schools, teachers and learners associated with the curriculum implementation of Agriculture. These findings could only be used to illuminate the teaching strategies, resources available and how the learners learnt this subject in the two senior secondary schools using the three teachers as respondents.

What I consider as a serious limitation in this study was that I did not make the learners in these two schools a part of the study. This being the case I feel that their views, ideas and perceptions that were ignored in the study, could perhaps have provided greater richness of data to inform me in my capacity as an Advisory Teacher. In addition, I did not include the Advisory Teacher for the region in the study which I think also reduced the richness of the data, which perhaps could have made a difference in the knowledge and understanding gained.

6.7 Possibilities for further study and tentative suggestions

Since I have not given a full representation and reflection of how Agriculture is taught and learnt in most of the Namibian schools at the level the study was conducted, I

hope other interested partners in education and researchers will take up the study further from where I have left, and also conduct similar case studies so that they can either affirm, add to, contest or challenge the validity and reliability of my findings.

6.8 Conclusion

In this chapter I tried to reflect on what prompted me to conduct this study and why I thought I achieved the aims of conducting the study. I identified the key issues and concerns that the research revealed. I also made some tentative comments about some of the contributing factors that led to the results obtained by using an interpretive case study approach on the data collected by means of interviews, observations and document analysis.

Finally I came up with some tentative suggestions about how to address the identified concerns. I hope that the findings and tentative suggestions made in this study will inform my ongoing work as an Advisory Teacher in my designated region.

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Appendix 1

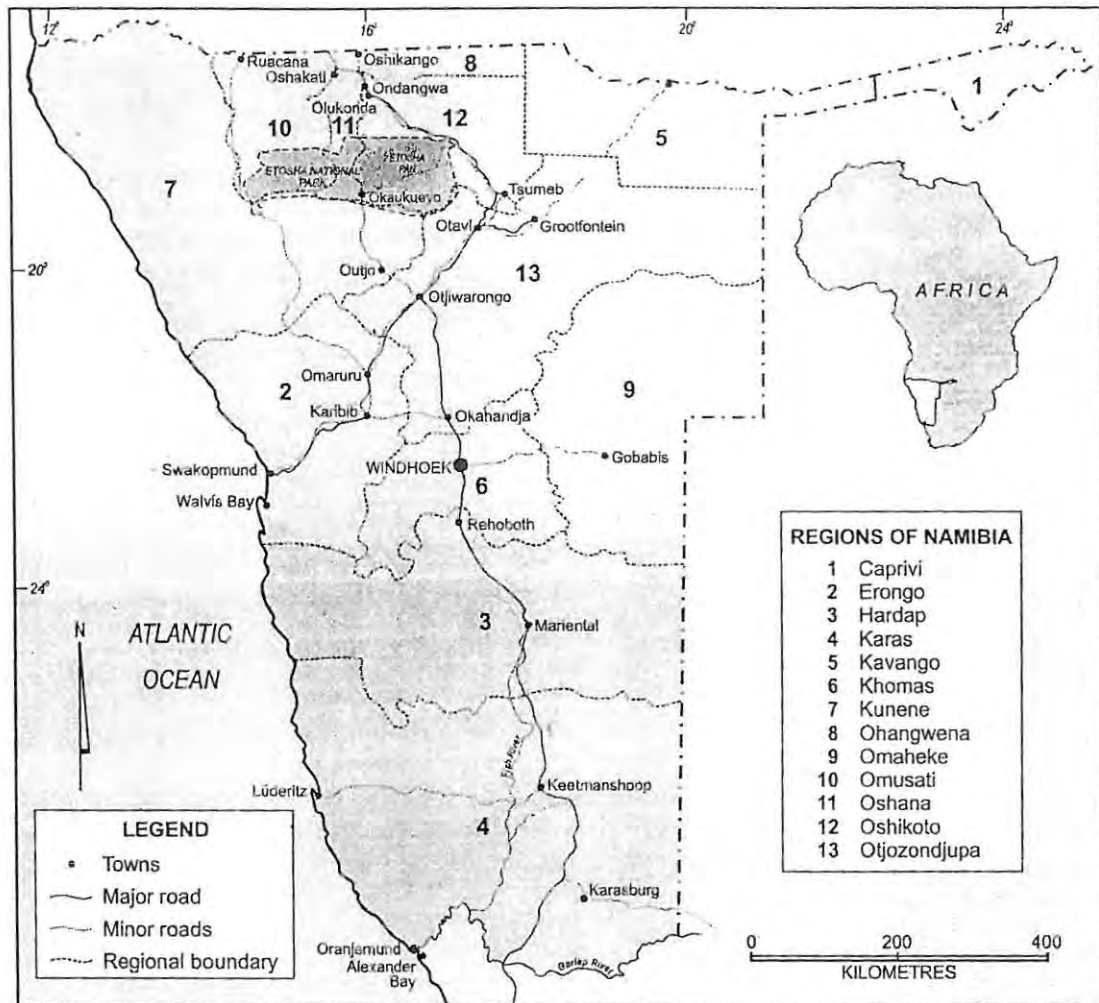


Figure 1. Map of the regions of Namibia
 (Sue Abraham. (2006). Graphics Services Unit, Rhodes University, Grahamstown.)

Appendix 2

Semi-structured interview (PILOT)

1. General Information

Interviewer: Good morning madam,

Interviewee: Good morning Sir.

Interviewer: Before we get started with our business, may I know your name madam?

Interviewee: My name is Ms. A (Pseudoname).

Interviewer: That is fantastic, Ms. A as I have already introduced myself to you that I am Kasenga, a teacher educator at Caprivi College of Education, I am going to ask you a few questions about my research. It is a research that is based on the implementation of Agriculture in our classrooms. So before I get started I will need background information about you.

Interviewer: Madam, what is the name of this school?

Interviewee: It is known as W Junior Secondary School (Pseudoname).

Interviewer: What information about your school can you share with me?

2. Teacher's information

Interviewer: What is your professional qualification currently?

Interviewee: Currently I hold a B.Ed in Management from South Africa UNISA;

Interviewer: Ok,

Interviewee: Yes, I graduated last year on the 7 of May in Windhoek.

Interviewer: Ok,

Interviewee: Yes.

Interviewer: Ok, that's good.

Interviewer: Eee, for how long have you been teaching agriculture at this school?

Interviewee: I think I started teaching Agriculture at this school in 2000.

Interviewer: Ok, the year 2000.

Interviewee: Yes.

Interviewer: The year 2000, Ok.

Interviewer: Now, eee, what about the phase that you are teaching now, for how long have you been teaching the phase it self?

Interviewee: The phase I think since I started, I started with grade 9 in 2000 and grade 10 also. I think those are the phases where I am usually teaching.

Interviewer: Ok,

Interviewee: Yes.

Interviewer: Thank you very much Ms. A.

Interviewer: Are there any current studies that you are pursuing that are related to teaching agriculture at this level?

Interviewee: Yes, like what I have said that I have B.Ed since my courses I studied with VISTA University.

Interviewer: Ok,

Interviewee: So that is where I have taken this Agricultural Science I all have all the certificates, the senior certificates for this Agricultural Science with VISTA University, then I did my SED diploma also in Agricultural Science, also I did HED still specializing in Agricultural Science and this Biology.

Interviewer: Ok,

Interviewee: Yes.

Interviewer: Oh, Ms. A you seem to be well versed in this field and you have quite relevant qualifications to teach this subject.

Interviewer: Now, I will ask you few questions about your perceptions.

3. Perceptions (relevance)

Interviewer: What is your opinion on the current agricultural Namibian curriculum regarding how it meets the needs of the junior secondary school learners and why?

Interviewee: I think the curriculum is okay.

Interviewer: Ok,

Interviewee: Because since the curriculum is a broad one for example the document for education let me say like that when I look at the content of Agriculture I think it is good for the learners, because we are preparing them to become responsible adults some may become farmers and so on.

Interviewer: Ok,

Interviewee: So they may help during the process of learning so that the things that they have learnt in school can still also be applied when they go outside of school.

Interviewer: Ok,

Interviewee: And learners may not have jobs in this government and what so ever so they can help the communities on the things that they have learnt in the school for example cultivating the land, breeding animals and help for example if some animals are having a health problem so the knowledge that they get in school can also still apply to help in the community.

Interviewer: The other question is still on the curriculum of course you have already stated the advantages and you are in favour of the Namibian curriculum system.

Interviewer: Do you think there is any thing new that has been missed out in the junior secondary school agricultural curriculum, if 'yes' why? If 'no' why?

Interviewee: I need time to think about it.

Interviewer: Thank you.

4. Curriculum objectives

Interviewer: What is your opinion regarding the teaching of Agriculture at junior secondary school level?

Interviewee: I think it is fine because it lays the foundation for learners to gain some insight in agriculture possibly they may also like the subject.

Interviewer: What do you think should be the curriculum objectives for the junior secondary school Agricultural curriculum?

Interviewee: Though this question is difficult for me to answer now because some of the things may be I am not well vested in them.

Interviewer: Ok,

Interviewee: Now what I know according to the syllabus that I use there are many objectives that we need to meet.

Interviewer: Ok,

Interviewee: Or for a grade 10 learner to meet like what I have already said.

Interviewer: You're right,

Interviewee: Yes, like what I have already said the learners should learn these things using their hands,

Interviewer: Uuuuu,

Interviewee: for breeding animals or breeding poultry and so on,

Interviewer: Okay,

Interviewee: so that they can help them in their future life.

Interviewer: So they have to focus on practicals,

Interviewee: Yaa because Agriculture is a practical subject.

Interviewer: Okay,

Interviewee: Yes, because we need to focus much on the practicals, like for poultry they are learning about poultry, they should know how to handle the chickens; they should also know how to handle animals like cattle and so on.

Interviewer: Okay.

Interviewee: Yes,

Interviewer: Thank you very much Ms. A,

Interviewee: Thank you sir.

Interviewer: In case some of them fail to attain higher education they can still be, they can venture in agriculture as farmers or business people,

Interviewee: Yes,

Interviewer: Okay, that's fine.

Interviewer: Now in your opinion Ms. A, what do you think are the difficult curriculum objectives to achieve in teaching Agriculture in the syllabus and why?

Interviewee: There are many of them like in grade 9 for example I am also treating a section which is about 'farming technology' where by the learners need to know about this tractor engine and what so ever,

Interviewer: Okay,

Interviewee: Like for myself certain topics like those ones, they are a problem because we don't have enough resources in schools,

Interviewer: Okay,

Interviewee: And then when you approach some one like in the community, those people they don't know how this system is working, fuel and so on and moreover I am a lady so some of the parts of an engine I don't know,

Interviewer: Okay,

Interviewee: So those are certain things that I don't know, there are many things if I could have a syllabus now, that I could outline that we can not do in schools,

Interviewer: Okay,

Interviewee: and because of not having enough materials,

Interviewer: Okay,

Interviewee: a certain topic when you treat it then it will need you to do something then you cannot do that thing because you don't have enough materials on a school level. Some of the issues like, they say that we should go or visit a farm, like in our region we don't have enough commercial farmers most of the people that we have they are subsistence farmers and myself I am teaching in an urban school where by the villages are very far so when it comes to certain issues like how do they castrate the animals and so on the learners need to demonstrate that castration is done this way,

Interviewer: Okay,

Interviewee: so it becomes a problem,

Interviewer: Okay,

Interviewee: Yes.

Interviewer: It is quite interesting Ms A, there is one point of interest that you just mentioned; you said you have problems since you are a lady,

Interviewee: Yes,

Interviewer: now what do you mean by that can you just clarify on that one?

Interviewee: Yaaa, for the...like what I have said about castration,

Interviewer: Okay,

Interviewee: Yes, let me say that I am dealing with that topic about castration because the objectives in the syllabus will tell me that the learners need to castrate a bull so when we go there I am the first one to demonstrate to the learners how a bull is being castrated so it becomes a bit difficult for me to do that job.

Interviewer: How does it become difficult for you to do it?

Interviewee: To handle the animal and to put it in a crash and so on so because I am not used,

Interviewer: Because you are not used?

Interviewee: Yes,

Interviewer: Now Ms. A haven't you heard of state veterinarians who are females, doctors who are females, who look after livestock and carry out all the operations that are supposed to be carried out on livestock, haven't you heard that?

Interviewee: Yaaa, I have heard about them.

Interviewer: Now what would be the difference between you and those people?

Interviewee: The difference is that myself I am a teacher, those ones are professionally qualified to do that job,

Interviewer: Okay,

Interviewee: They have done some courses what so ever to handle animals and so on, so as a teacher myself I just read it in the syllabus and there's no where we have gone to a workshop whereby we are shown on how to castrate or to do what they just only tell us in the syllabus that the learners should do this and this and for example just at our surroundings or on the school we don't have a crash pen or we don't have some animals there, like what I have just said the farmers more especially the subsistence farmers are far away from the town so there is no where I can take my learners.

Interviewer: Okay, that is quite interesting Ms. A, I have two follow up questions to that, having listened to you, you have got a chain of qualifications that clearly shows that you can implement the curriculum in the classroom situation and elsewhere so that your learners can learn well, now in these qualification that you attained were not subjected to

practical activities such as the ones you have mentioned like castration, dehorning, and all that?

Interviewee: No, we didn't do that one because it was on a distance learning,

Interviewer: Okay,

Interviewee: I just only did them by distance teaching oh, distance learning sorry.

Interviewer: Okay, now why are you failing to keep some of those resources lacking in your school on which you can carry out some practicals, you are talking about, now why are you not keeping some few animals and maybe few crops and everything that your learners can practice on? What is hampering your school to do that?

Interviewee: Yaaa because there are certain topics that we always do at school, those ones that we can do we always do like crop farming,

Interviewer: Okay,

Interviewee: Like in the syllabus for grade 10 we always do about these cereal crops, I think my learners on that line we always do our best they always grow maize and see how the maize germinates, the pests and so on,

Interviewer: Okay,

Interviewee: Yes, but for animals it is difficult to keep animals in an urban area,

Interviewer: Okay,

Interviewee: Yes,

Interviewer: So can't you make an improvisation because I have seen some institutions you can be right up in town but you can solicit for a piece of land some few kilometers out and then that piece of land should belong to the school and you can keep some animals there and keep them for your learners is it not possible can't it be done?

Interviewee: Yaaa, it can be possible if we have enough funds but now our school is just a small school we don't have enough funds to buy those things.

Interviewer: So the problem is funds,

Interviewee: Yes,

Interviewer: Okay, thank you very much madam.

Interviewer: Eeee, let us come to the syllabus.

5. Information on syllabus

Interviewer: When last did you receive the revised Agriculture syllabus for the junior grades that you are teaching?

Interviewee: It was 2003,

Interviewer: 2003?

Interviewee: Yes,

Interviewer: Okay' were there some changes compared to the old one that you used to use?

Interviewee: I think there were no changes, the only change that I have seen is that in the old syllabus there were just objectives there that the learners should know but with the current syllabus, I think it has some basic competencies that the learners should know at the end of every topic.

Interviewer: Okay,

Interviewee: Yes,

Interviewer: will it be possible for you to arrange for me one old syllabus that you have been using and the current one?

Interviewee: Okay,

Interviewer: Okay,

Interviewee: I think I have them all,

Interviewer: Okay thank you very much madam.

Interviewer: In what way is the content of the new syllabus relevant to the learners that you are teaching?

Interviewee: I think the content is good like what I have said already,

Interviewer: Okay,

Interviewee: Yes it suits the learners that we have.

Interviewer: Okay,

Interviewee: Because I say that because when the examination comes the learners are able to answer the questions which are in the question paper, this means that the level of the syllabus, how it is designed suits their level because they can answer some questions there.

Interviewer: Okay,

Interviewee: Yes.

Interviewer: It is quite interesting you have mentioned about questions coming in the examinations, I have a question following that but I will just pick it up from there, how was the performance of your learners in the previous examination?

Interviewee: Last year,

Interviewer: Yes, last year,

Interviewee: Last year the performance was very good,

Interviewer: Okay,

Interviewee: since I started teaching this Agriculture, last year,

Interviewer: Okay,

Interviewee: Last year I managed to obtain good grades,

Interviewer: Any 'A's you got?

Interviewee: Yes I got four 'A',

Interviewer: You got four 'A's

Interviewee: Yes,

Interviewer: 'B's?

Interviewee: They were sixteen,

Interviewer: Sixteen 'B's?

Interviewee: Yes.

Interviewer: Oh that's fascinating 'C's?

Interviewee: 'C's they Thirty-one,

Interviewer: 'C's they were thirty-one,

Interviewee: Yes and 'D's they were thirty-two,

Interviewer: Okay,

Interviewee: Yes and there was no ungraded.

Interviewer: There was no ungraded?

Interviewee: Yes.

Interviewer: That's excellent.

Interviewer: So despite the handicap of carrying out practicals, but the theoretical part you are able to impart in your learners and they are performing quite well,

Interviewee: Yes,

Interviewer: So that is quite excellent, okay the other question is still on the syllabus.

Interviewer: In what way is the syllabus too easy or difficult for learners that you are teaching?

Interviewee: Yaaa the practical part because these learners think that when you take them out of the class they think that they are not learning,

Interviewer: Okay,

Interviewee: Because in the oldern days Agriculture was seen as an easy subject where by they could just memorise,

Interviewer: You are right,

Interviewee: Now when you take them out of the class to do a plot or to make anything from the theory that that they have done in class they tend to make it as a leisure or they are just joking and so on,

Interviewer: Okay,

Interviewee: Yes,

Interviewer: So they don't attach seriousness to practical work?

Interviewee: Yes they don't attach seriousness,

Interviewer: and at times they don't regard practicals to be part of the subject,

Interviewee: Yes,

Interviewer: Okay, Anhaaa, so that is the difficult part, what about the easy part?

Interviewee: The easy part is the theoretical one because most of the parts that we treat in Agriculture are the things that they do at home,

Interviewer: Okay,

Interviewee: most of the things they do them at home like breeding animals they do them at home, they see how the cattle are milked what so ever, how they graze the grasses and so on, I think it is easy,

Interviewer: Okay,

Interviewee: Yes,

Interviewer: So it has more relevance to the real life situation of the learners,

Interviewee: Yes,

Interviewer: Okay, that's good.

Interviewer: Now which topics would you like to be removed from the new syllabus that has been brought to you and why?

Interviewee: I think most of the topics that are covered in the syllabus are good, all of them I see them as beneficial to learners,

Interviewer: How beneficial are they to the learners?

Interviewer: Like in grade 10 there is a topic which is talking about 'fish farming'; I think this is one of the most agricultural activity which is done in Namibia,

Interviewer: Okay,

Interviewee: and in our region here we still have local fishes there so in that topic learners can learn how to preserve the fish, it is a good thing because currently now we some of these ponds which have been done just in regions and whatsoever , so when we treat such a topic the learners can still go out when they go on holiday or so on like at Kalimbeza we have some ponds for fishes there they can still go there and help the parents how to breed the fish, how to feed them, and how to preserve the fish,

Interviewer: Okay,

Interviewee: Yes,

Interviewer: That's fine, now let's come to the assessment,

Interviewer: Is the assessment in the syllabus you are teaching clear to the learners?

Interviewee: Yes it is clear to the learners because everything, after every lesson we usually assess learners, we may assess responsibility, for example if a learner, if I make a topic or I give the topic to the learners like for the past few weeks I have given them an activity or an assessment on 'recording rainfall,

Interviewer: Unuuuu,

Interviewee: so we did it theoretically in the class,

Interviewer: Okay,

Interviewee: and then they could make their own rain gauge there, then I assess 'responsibility' on that one I mean learners need to record the amount of rainfall that is received every day,

Interviewer: Okay,

Interviewee: because, I just only gave them for only two months, for February and March so the learners on that topic I need to assess the 'responsibility' whether they are taking records every day and they should make sure that every day they need to record the amount of rainfall that we get,

Interviewer: Okay,

Interviewee: till the last day when they should do the activity, so on that activity I need to assess whether the learners are really responsible when you give them work to do in the class,

Interviewer: Okay,

Interviewee: Yes,

Interviewer: Ooh that's quite good.

Interviewer: Now if I may ask you, is the time allocated to the teaching of the existing syllabus sufficient enough and why?

Interviewee: I think the time is not sufficient,

Interviewer: It is not sufficient?

Interviewee: Yaaa because it is only four (4) periods per week,

Interviewer: Okay,

Interviewee: in each class if it is only 10 A you need to go there four times, sometimes you are going to see that the other part of the lesson you are not going to cover that in one period, so you still need more time, in the olden days you could see that every subject has double periods and so on, so may be if it could be six periods per week and so on, so that you can have more time like what I have already said Agriculture is a practical subject, you are going to see that in one period you have just covered the theoretical part of the lesson,

Interviewer: Okay,

Interviewee: then the practical maybe you are going to do it tomorrow, so it becomes a problem to learners because these lessons should be one lesson so that learners can connect theory to practicals.

Interviewer: Okay,

Interviewee: Okay,

6. Other materials

Interviewer: Do you have any teachers' guides to the Agriculture syllabus you are using?

Interviewee: I think we have the guide 'Yes' which is guiding us about the theoretical part and what we should do in the practical part of the lesson,

Interviewer: Okay,

Interviewee: Yes,

Interviewer: now how helpful are they to you in teaching the subject?

Interviewee: I think they are very helpful, I have one here,

Interviewer: Okay,

Interviewee: every lesson if there is a practical that should be done it is written there accordingly and the procedures about how you should do it up to the end and that guide will also help you what skill do you suppose to assess at the end of that practical,

Interviewer: So they are very explicit,

Interviewee: Yes,

Interviewer: they give you the outline that you are supposed to follow,

Interviewee: Yes,

Interviewer: Okay thank you very much Ms. A.

Interviewer: Now coming to policy documents; what policy documents apart from the syllabus do you have which could assist you in implementing the new curriculum for Agriculture?

Interviewee: I think to the policies that one is a problem,

Interviewer: Okay,

Interviewee: because some other subjects you are going to here that there is a subject policy, I don't know to other schools, but I have asked some of my friends in the near by schools they don't have a subject policy for Agriculture that one also is a problem,

Interviewer: Okay,

Interviewee: Yes, we are just using a syllabus and some guides and then reference books but when it comes to this subject policy, we don't have,

Interviewer: Okay,

Interviewee: Yes,

Interviewer: What about the Broad Curriculum don't you have one pertaining to your subject?

Interviewee: We don't have we just have a syllabus.

Interviewer: Only the syllabus and a guide?

Interviewee: Yes,

Interviewer: Okay.

Interviewer: Now coming to sources like textbooks in your school do all your learners have relevant textbooks for Agriculture?

Interviewee: I think currently we don't have enough textbooks,

Interviewer: Okay,

Interviewee: because we have 6 classes at our school for grade 10, so last year we were having 141 learners so the textbooks are not enough for the learners,

Interviewer: Okay'

Interviewee: Yes.

Interviewer: How relevant are they to the current teaching, the few that you have?

Interviewee: The few that we have, yes they are relevant but some topics are not really covered in the textbooks, 'The Agricultural Science in Context for grade 10' some of the topics you need to go somewhere to go and search for information to give to learners,

Interviewer: Okay,

Interviewee: Yes because the syllabus will state that the learner should do this and this the problem is that when you go to the textbook, the information is nowhere to be found,

Interviewer: Okay,

Interviewee: Yes, or some of the topics.

Interviewer: Can you just mention to me some of those few topics which you think are not covered?

Interviewee: Unuuuuu, I have forgotten them.

Interviewer: You have forgotten them?

Interviewee: Yes, like the 'Environmental Factors' that hamper agriculture in Namibia they are just listed, they are only two which are covered in the textbook,

Interviewer: Okay,

Interviewer: It is rainfall and temperature, like for 'wind', 'humidity' and so on just explain the terms but how they influence agriculture the information is not in the book so you still need to go somewhere and find out how are these environmental factors hampering agriculture in Namibia,

Interviewer: Okay,

Interviewee: Yes,

Interviewer: This is good but then the few textbooks that you are using in your school, when did you get them?

Interviewee: The textbooks we got them in the year 2000.

Interviewer: After the year 2000, you didn't receive any new textbooks,

Interviewee: We always receive but then we always receive the same textbooks.

Interviewer: In which year were these textbooks published?

Interviewee: I think maybe it was 1997,

Interviewer: 1997,

Interviewee: Yes if I am not mistaken, maybe it is the year 2000, I don't know, it is 2000.

Interviewer: Okay, thank you very much Ms. A.

Interviewer: Let us move on to the next question, what are other support materials that are available for your grade?

Interviewee: I think I always use some resources like relevant textbooks like the 'O'-Level Agriculture.

Interviewer: It is quite interesting that you have mentioned 'O'-Level Agriculture, when was it published?

Interviewee: I don't know which year I just usually use it.

Interviewer: I think it should be around 1985, so you consult 'O'-Level Agriculture,

Interviewee: and 'Agriculture for Southern Africa'.

Interviewer: How helpful are these extra support materials in teaching Agriculture?

Interviewee: And I also use the other guide which is called 'Excellent Agriculture' it was written just by a local teacher here Mr. Mashebe at Ngweze Senior Secondary School,

Interviewer: Okay,

Interviewee: It is also helpful.

Interviewer: When was it published?

Interviewee: I think it was last year.

Interviewer: Last year 2005?

Interviewee: 2005,

Interviewer: Okay, and the book is quite helpful,

Interviewee: Yaaa, it is helpful because there are summaries there, there are descriptions at the end of each topic there are questions that you can give to the learners,

Interviewer: Okay,

Interviewee: and those questions they are just the same as the questions that always come at the end of the year,

Interviewer: Okay, like model questions?

Interviewee: Yes.

Interviewer: Still on the support materials, where do you normally get your support materials from?

Interviewee: Some of the books I got them when I came here it was used by the former teacher who passed away like this 'Agriculture for Southern Africa', I got it from Ms. Liswaniso who was teaching this subject when she was transferred she gave the books to me, some of them I usually buy for myself because I am also studying this Agricultural Science. Like for other things I always use also some guides for VISTA that I was also studying when I was doing this Agricultural Science on an academic level.

Interviewer: That is good and I like your spirit because you are always reading, you are always upgrading yourself because a teacher cannot just sit without reading so you have to keep yourself abreast with the current issues of the educational system of your country.

Interviewer: What are other support materials do you still need to assist you in teaching Agriculture which are not available at your school and why?

Interviewee: There is nothing in exceptional of the practicals which we always do with our learners to supplement the theoretical part.

Interviewer: Okay,

Interviewee: and other support materials include may be there is a topic which I don't know very well, I will invite some one locally here to come and treat that topic to my learners.

Interviewer: So you also use the sources in the community to come and help you?

Interviewee: Yes.

Interviewer: Can you give one topic that you used sources from outside?

Interviewee: For this Agricultural Science for grade 9 like I have already said is 'Farm Mechanics' and so on because I don't the engines and so on so I ask someone from the community to come and help me in teaching the learners about engines such as the petrol engine, diesel engine and so on.

Interviewer: Okay, what type of machine did you use; did you use the actual tractor?

Interviewee: Yaaa I used the actual tractor.

Interviewer: Was it brought in the school or learners were made to go out for it?

Interviewee: It was brought in we just asked from Mr. Buiswalelo,

Interviewer: Okay,

Interviewee: He is having a tractor when he was still here, then it was brought to the school,

Interviewer: Okay,

Interviewee: He just brought in his driver the one who showed learners all the parts of the tractor.

Interviewer: Okay, thank you very much.

7. Classroom activities

Interviewer: Let us come to the classroom activities, what methods do you use in teaching Agriculture in your class?

Interviewee: I use group-work most of the time I usually use group-work,

Interviewer: Okay,

Interviewee: Yes,

Interviewer: Group-work,

Interviewee: Yes.

Interviewer: How do you use group-work in your class?

Interviewee: Let us say I am treating a certain topic and then when I have treated that topic, maybe I just introduce the lesson, and then we just discuss it with the learners so

that the learners should know what they are doing when I will give them the activity to do in the groups. So when I am certain that each and every learner knows what to do, then I will divide the learners into groups of 4s or 5s and so on, and then I will give each group, let us say I am treating about dosing, castration, immunization.

8.6 Learning/Teaching Aids

Interviewer: Okay madam what type of learning/teaching aids assist you in teaching Agriculture in your classroom?

Interviewee: I think there are a number of teaching aids that you can use it just depends on the type of lesson that you are going to give to the learners for example in the syllabus for grade 10 there is a topic which is dealing about the grasses I think we only go outside identifying the type of grasses that are just locally in our school,

Interviewer: Okay,

Interviewee: Yes,

Interviewer: I see apart from the grasses, any other type of teaching aid that you are using?

Interviewee: I use the textbooks and for example Agriculture as a practical subject more especially all the things that we teach we only find them outside the class or I just send them to just go and find out from home or from the community.

Interviewer: How do you obtain the learning/teaching aids for your school?

Interviewer: Thank you very much Ms. A what learning/teaching aids are still lacking in your subject?

Interviewee: Currently they are many of them more especially when we are testing the soil there is a problem for finding the soil indicators, we don't have and the soil pH. scale we don't have even myself as a teacher I don't have when I reached here they said that they were having one so I don't know where it went. So it becomes a problem because the learners need to see the soil pH. scale.

Interviewer: Okay,

Interviewee: Yes,

Interviewer: How have you been handling that problem in the absence of the instruments that you have just mentioned?

Interviewee: I just always tell them and give examples, using textbooks where they are indicated. I also tell them how they usually test urine at the hospital in case of a pregnant woman colours on the instruments/materials used are indicated. At the same time I usually borrow these materials from a teacher that offers Life Science.

Interviewer: Okay madam.

8.7 Tools

Interviewer: Let us look at the tools/equipment what tools/equipment assist you in teaching Agriculture?

Interviewee: Certain tools as I have said we have but some we don't have like spades they are enough though we just have a hand fork but the learners can see that this is a spade, a garden fork and a rake as well as the watering cans and so on.

Interviewer: So it means that in most cases learners have to share those tools?

Interviewee: Yes they have to share because they are not enough because learners are many.

Interviewer: How do you obtain the agricultural tools and equipment for your school?

Interviewee: I think we always buy each year we always submit a requisition to the management so they usually buy for us.

Interviewer: Any other comments that you would like to make support?

Interviewee: I think I don't have much comment the only thing is that as a school we need to have more equipment for the learners so that when they go outside each and every learner should be involved in the lesson you are going to find that some learners are using one spade and you cannot control all the learners because others will just be standing there and waiting for the who is having the spade and it is just only 40 minutes for each class. So we need a lot of implements and then from there my other comment is to the Advisory Teachers may be if they could help us in obtaining these tools because Agriculture needs a lot of tools, every topic that you are going to treat it needs a certain tool so we are running short of tools.

Interviewer: Thank you very much madam.

9. Problems and constraints

Interviewer: What problems have you so far encountered in implementing the new curriculum for Agriculture?

Interviewee: Yes because this learner-centred approach has given learners more freedom in the classroom, you will find that when you are teaching these learners are just making noise in the class and there is nothing that you can do. So you can try to make them keep quiet they will just start to make some jokes and so on and then moreover you don't have powers to punish them or to give them corporal punishment. You can just only follow them but they will not cooperate with you as a teacher. Some learners just see school like a playing ground.

Interviewer: Okay,

Interviewee: Yes.

Interviewer: What problems have you encountered in implementing the new assessment criteria in Agriculture?

Interviewee: As a teacher most of the assessments I know the but the problem lies with the learners. Currently if I was going to give you one exercise you are going to see that when you give the instruction for the assessment whether it is practical some learners tend to dodge. Yes, you are going to give the due date that this practical activity should be done up to this date, then you call in the learners for the books only to find that it is just a hand full of learners who are going to attend or who are going to bring the books the other learners will just stay and then when you give corrections, you tell them to write the corrections, they don't do the corrections.

Interviewer: Okay,

Interviewee: Yes.

Interviewer: Now there is this concept which we use in schools known as 'continuous assessment' what do you understand by this concept?

Interviewee: Continuous Assessment yes, is good in the school because you are busy assessing the progress of the learners each and every time whether it is orally or written

and during learning you can still assess the progress of the learners in that topic. You can still assess the learners at the end of the term or during the term, yes.

Interviewer: Do you record the grades of the assessment?

Interviewee: You don't record the grades but you should record the marks,

Interviewer: the marks,

Interviewee: Yes, if the practical activity more especially in grade 10 every practical activity that you are going to give to the learners must be awarded marks according to how the learner is going to carry out the practical. If the learner is responsible according to the instruction that you have given you can give him or her total marks.

Interviewer: So it seems as if you only record practical marks only?

Interviewee: No even theory more especially the tests that learners should write should be recorded more especially in grade 10. But at the end of the second term you choose only 6 tests that will contribute to the final examination.

Interviewer: Now you have mentioned something to do with practical work, how do you manage to handle practical work in larger classes?

Interviewee: So what I always do in every lesson is that I make some worksheets for each lesson and give them the instructions and an explanation so that they know what is expected of them. Thereafter I will give them a practical activity, there is a work book where they do write and then after writing it is when they will hand in the books for marking, evaluation and feedback.

Interviewer: I see that's quite fascinating.

10. *Interviewer:* Any general comments about the interview or your work that you would like to make?

Interviewee: I think I enjoyed this interview and it taught me a lot of things that I should be prepared each and every time in case there might be someone who would be coming to interview me and whatsoever.

Interviewer: Okay,

Interviewee: Yes.

Interviewer: Thank you very much Ms. A,

Interviewee: Thank you Sir.

Interviewer: It has been a nice time having been with you.

Appendix 3

Research Time Line

Date	Research Activity
26-02-2006	Informally made an appointment with Agriculture teachers (Grade 12) at X senior secondary school.
02-03-2006	<ul style="list-style-type: none"> ▪ Made an appointment with Principal and teacher A at W junior secondary school for interview piloting. ▪ Made an appointment with Mr. D a Grade 11 Agriculture teacher at Y senior secondary school.
03-03-2006	<ul style="list-style-type: none"> ▪ Piloted the interview questions at W junior secondary school with Ms. A (From 09:00hrs-10:00hrs. ▪ Gave Mr. D interview questions for preparation and fixed the interview date. ▪ Fixed an interview date with Messrs B and C. ▪ Gave out interview questions to X senior secondary school teachers for preparation.
06-03-2006	<ul style="list-style-type: none"> ▪ Carried out interviews with teachers at X senior secondary school. ▪ Interview time started with Mr. B between 09:00hrs-10: 10 hrs. ▪ Interview time with Mr. C between 11:00hrs-12: 10hrs.
07-03-2006	Class observations conducted for teachers Band C
10-03-2006	End of class observations for teachers B and C.
13-03-2006	<ul style="list-style-type: none"> ▪ Dropped letters for requesting carrying out an interview with Mr. D and the principal. ▪ Permission granted by the principal.

	<ul style="list-style-type: none"> ▪ Interview conducted with Mr. D.
14-03-2006 to 17-03-2006	Lesson observations started and stimulated recall also conducted with teacher D at school Y.
17-03-2006	End of school visit at school Y senior secondary school

Appendix 4

Semi-structured interview

1. General Information

- 1.1 What is your name?
- 1.2 What is the name of this school?
- 1.3 What information about your school can you share with me?

2. Teacher's information

- 2.1 For how long have you been teaching agriculture at senior secondary school level?
- 2.2 What is your professional qualification?
- 2.3. Are there any current studies that you are pursuing that are related to teaching agriculture at senior secondary school level?

3. Perceptions (relevance)

- 3.1 What is your opinion on the current agricultural Namibian curriculum regarding how it meets the needs of the senior secondary school learners and why?
- 3.2 Do you think there is any thing new that has been missed out in the senior secondary school agricultural curriculum, if 'yes' why? If 'no' why?

4. Curriculum objectives

- 4.1 What is your opinion regarding the teaching of Agriculture at senior secondary school level?
- 4.2 What do you think should be the curriculum objectives for the senior secondary school Agricultural curriculum?

4.3 In your opinion, what do you think are the difficult curriculum objectives to achieve in teaching Agriculture in the syllabus and why?

5. Information on syllabus

5.1 When did you receive the revised Agriculture syllabus for the senior grades that you are teaching?

5.2 In what way is the content of the new syllabus relevant to the learners that you are teaching?

5.3 In what way is the syllabus too easy or difficult for learners that you are teaching?

5.4 Which topics would you like to be removed from the syllabus and why?

5.5 What topics would you like to be added to the syllabus and why?

5.6 Is the assessment in the syllabus you are teaching clear to the learners, if 'Yes', what do you think makes it easy?

5.7 If 'no' which part of the assessment is not clear and why?

5.8 Is the time allocated to the teaching of the existing syllabus sufficient enough and why?

What is your suggestion?

6. Other materials

6.1 Do you have any teachers' guides to the Agriculture syllabus you are using?

If 'Yes' how helpful are they to you in teaching the subject?

If 'Not' what is your suggestion?

6.2 What policy documents apart from the syllabus do you have which could assist you in implementing the new curriculum for Agriculture?

6.3 How do you use these policy documents in implementing the curriculum for Agriculture?

6.4 Do all your learners have relevant textbooks for Agriculture?

If 'yes' when did they get the books?

If 'no' how do you cope with the problem of lacking textbooks?

6.5 How does the broad curriculum help you in implementing the curriculum for Agriculture?

6.6 What are other support materials that are available for your grade?

6.7 Where did you get these support materials?

6.8 How helpful are these extra support materials in teaching Agriculture?

6.9 What are other support materials do you still need to assist you in teaching Agriculture which are not available at your school and why?

7. Classroom activities

7.1 What methods do you use in teaching Agriculture in your class and why?

7.2 What methods do you use in teaching Agriculture outside the classroom situation and why?

7.3 In what way do learners participate in the lessons?

7.4 Do the basic competencies make the syllabus easier to teach in a learner-centred way and how?

If 'no' why?

7.5 What problems do you encounter in implementing learner-centred approach in teaching Agriculture?

7.6 What alternative teaching method would you suggest in a place of learner-centred approach?

8. General Support

8.1 In-service training

(a) Have you received in-service training in the implementation of Agriculture?

(b) How often did you receive the training?

(c) In which aspects of the curriculum did you receive the training?

(d) When last did you receive the in-service training in Agriculture?

- (e) In what way did the in-service training you received help you to implement the new curriculum for Agriculture?

8.2 Advisory Services

- (a) Has the advisory teacher for Agriculture ever visited your school?
- (b) How often does the advisory teacher for Agriculture visit your school?
- (c) When last did he/she visit your school?
- (d) How did the visit by the advisory teacher for Agriculture help to implement the new curriculum for Agriculture?

8.3 Projects

- (a) What kind of school project do you have at your school, which helps you in teaching agriculture?
- (b) How does it assist you in teaching Agriculture?
- (c) Where did you get funds to start up and sustain the project?

8.4 School support

- (a) In what ways does the school principal or HOD assist you in implementing the new Agriculture curriculum?
- (b) What other support do you obtain from the school management, which assists you in the teaching of Agriculture?

8.5 Community/Parent support

- (a) Are parents (community) assisting you and your learners in any way in implementing the new curriculum for Agriculture in your school?
 - If 'yes' how are they involved?
 - If 'no' why do you think they are not taking part?
- (b) How do you think parents should be involved in the implementation of the

Agriculture curriculum in schools?

8.6 Learning/Teaching Aids

- (a) What learning/teaching aids assist you in teaching Agriculture?
- (b) How do you obtain the learning/teaching aids for your school?
- (c) What learning/teaching aids are still lacking in the subject?

8.7 Tools

- (a) What tools assist you in teaching Agriculture?
- (b) Are the tools and other equipment sufficient for your learners?
- (c) How do you obtain the agricultural tools and equipment for your school?

8.8 Any other comments that you would like to make support?

9. Problems and constraints

9.1 What problems have you so far encountered in implementing the new curriculum for Agriculture?

9.2 What problems have you encountered in implementing the new assessment criteria in Agriculture?

9.3 How do you cope with the pressure of implementing continuous assessment for individual learners?

9.4 How do you manage the handling of practical work in Agriculture in larger classes?

10. Any general comments about the interview or your work that you would like to make?

Appendix 5

Lesson indicators (observation) adapted from Muyunda, (2001) M.Phil.

A. Teaching skills and classroom management

Observe lessons and find out the extent to which the teachers of Agriculture at the sample schools:

- 5.1 appear to be well organized to start the lesson
- 5.2 introduce the lesson in an appropriate way
- 5.3 ask questions to determine learner's prior knowledge
- 5.4 relate activities to the previous lesson
- 5.5 illustrate facts using demonstrations
- 5.6 maintain discipline in class
- 5.7 use classroom aids (chalkboard etc)
- 5.8 explain key concepts/new words
- 5.9 create opportunity for critical thinking

B. Learning-centred teaching approach

Observe how teachers of Agriculture at the two sample schools maintain the following in class:

- 5.10 provide enough opportunities for learners to share ideas
- 5.11 monitor learners' progress
- 5.12 involve learners in the lesson
- 5.13 attempts to find out why learners give certain answers
- 5.14 respond to learners' ideas and questions
- 5.15 encourage learners to ask questions
- 5.16 attempts to include inattentive learners

5.17 establishes the relevance of the activity to learners' daily lives

5.18 attempt to encourage learners to think critically

5.19 attempt to guide learners to draw up conclusions

To what extent do learners:

5.20 ask questions related to the topic?

5.21 show an active desire, intention and interest in the lesson?

5.22 receive sufficient time and support to complete a learning task successfully?

5.23 get opportunity to apply new knowledge e.g. problem solving?

5.24 able to express themselves in English?

Syllabus Content

Observe lessons and examine the syllabus, teachers' schemes of work to find out to what extent:

5.25 does the teacher relay acceptable information to learners?

5.26 does the lesson plan of the teacher correspond to the basic content in the syllabus?

5.27 is the teacher's lesson preparation of acceptable standard?

5.28 does the scheme of work correspond to the syllabus content?

5.29 are the teaching methods appropriate to the lesson content?

5.30 is the assessment relevant and appropriate to the content of the syllabus?

5.31 does the teacher adhere to the time allocated for the lesson?

5.32 is the teacher confident in delivering the lesson?

5.33 List any other observation made not mentioned above and give comments.

Appendix 6

Class Observation Sheet

Teacher: Mr. B	School: X Senior Secondary	Date: 07/03/2006
	Number of learners: 35	Length of lesson: 40 minutes

Theme: Livestock Husbandry
Class: 12B

Topic: Health & Diseases

Time	Description of lesson		Comments
11:30	<p>Class who can still remember what we learnt about yesterday? Yes, Siseho Is he correct class? Okay class, is that all we learnt yesterday? Who can add on? Yes, Mubita?</p>	<p>We learnt about 'signs of ill health'. Yes. No sir.</p>	<ol style="list-style-type: none"> 1. Why did you decide to use group work out of all the recommended teaching and learning strategies in LCE? 2. I realized that you only used question and answer strategies assisted with a chalkboard as you were teaching your learners about: vaccine, sera, antibiotics, antiseptics and disinfectants, do you think by using the method you used your learners will have a deeper conceptual understanding about these concepts and why? 3. Why didn't you bring along some samples of these substances for the learners to see? 4. I realized that you didn't demonstrate to your learners and make them
11:35	<p>Is he correct class?</p> <p>So today class we are going to continue learning about the same topic but this time we are going to focus our discussion on how the following are used and assist in controlling and treating livestock diseases and I am going to write them on the chalkboard:</p> <ul style="list-style-type: none"> - Vaccine - Sera - Antibiotics - Antiseptics - Disinfectants 	<p>We learnt also about signs of health in Ruminants and Poultry.</p> <p>Yes sir.</p>	
11:45	<p>Now class I want you to be in groups of 7 and each group is going to be given one of these concepts written on the chalkboard to discuss and one from each group is going to stand up and present the findings of each group to the whole class. Do you understand?</p>	<p>Yes sir.</p>	

<p>11:55</p>	<ul style="list-style-type: none"> - Antibiotics - Antiseptics - Disinfectants <p>Now class I want you to be in groups of 7 and each group is going to be given one of these concepts written on the chalkboard to discuss and one from each group is going to stand up and present the findings of each group to the whole class. Do you understand? Okay let us now begin the exercise. I will give each group a number, this group is number 1, this one number 2, this one number 3, this one number 4 and that one number 5, so each group will take each concept in the given order according to their numbers. So you can get started by working on your allocated concept. I will give you 10 minutes to do this. Start now.</p> <p>Everybody stop and let us listen to the outcome of your discussions and which group would like to start presenting the outcome of their discussion to us?</p> <p>Okay, Kalimbula's group can you go ahead presenting to the class your findings meanwhile the rest of the groups should pay particular attention as they do so.</p> <p>Are they correct class? Are vaccines injected in an animal before or after catching a disease? That's correct class, so vaccines are injected in animals so that an animal can respond by producing antibodies that can help to attack a particular disease. Remember the drug it self is not the one that is going to cure the animal but it is going to help the body of an animal to produce antibodies that will help fight the disease causing</p>	<p>It is us sir.</p> <p>Vaccines are a preparation of dead diseases or organisms, which are injected in the body of an animal. The presences of vaccines stimulate the body of an animal to produce antibodies, which will protect the animal against diseases. In addition to that vaccines are used to prevent animals from catching foot and mouth disease.</p> <p>Yes sir.</p> <p>Before.</p> <p>It is our group sir.</p> <p>Thank you sir. Sera are the colourless liquid part of blood.</p> <p>Yes sir. No sir they are not fully correct. They omitted the point that they do not contain some red blood cells.</p>	<p>practice how these substances are prepared and administered in an animal, why didn't you do this?</p> <ol style="list-style-type: none"> 5. During your lesson presentation I heard you calling 'bacteria' as 'bacterias' and later on even some of your learners started imitating you and they also said 'bacterias', why? 6. As you were busy giving the definition of the concept 'disinfectant' I heard you in your definition that you used again the word 'disinfectant' why did you have to do this? 7. When you talked about the disease causing organisms regarding their control, much of your focus was on bacteria leaving out other disease causing organisms, why did you have to do this?
<p>12:05</p>			

<p>12:10</p>	<p>organisms.</p> <p>Okay let us come to the other group, which one would like to give it a try?</p> <p>Okay what we are going to do class is just to follow the order according to the number allocated to each group. Since Kalimbula's group is the first one we automatically come to Mubita's group which is the second one and so on and so on. Okay Mubita's group let us listen from you now.</p> <p>Class are they correct? He is saying sera are the colourless liquid part of blood.</p> <p>Yes they do not contain some red blood cells. So when you are preparing a vaccine you are able to extract this substance, as you extract it you can use to prepare a vaccine.</p> <p>Liswaniso why are you putting up your hand? Now how did you want them to put it? Now class do you agree with Liswaniso's correction and contribution?</p> <p>Fine, let us come to the third group which is Monde's group what do you have for us?</p> <p>Do you agree with them class? Any addition or contradiction class? So he is saying about 'antibiotics'. Antibiotics are used to stop the growth and spread of a disease in an animal body in case of bacterias and</p>	<p>Yes sir.</p> <p>Ours is about 'antibiotics', antibiotics are drugs that are obtained from living organisms and an example of these is a bacteria.</p> <p>Yes sir. Nothing sir. It is fine everything she has said is correct.</p> <p>Antiseptics are used for cleaning the wounds.</p> <p>Yes sir.</p> <p>Antiseptics are used for cleaning wounds. Yes sir.</p>	
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<p>other viral diseases. Antibiotics are used to fight against bacterias. That is why they are known as 'anti' meaning something, which is against. Please put up your hand as you respond, 'yes' Charity?</p> <p>Okay, let us come to the fourth group which is Mary's group, Mary what do you have for us in terms of what 'Antiseptics' are? Do you agree with them class? I don't fully agree with them there is something that they have omitted in their explanation, what do you think that is?</p> <p>I remember yesterday telling you that some of you do not know what an antiseptic is do you agree now, Yes Charles?</p> <p>Correct Charles, are you listening Mary's group? Who can repeat for us in your group what Charles has just said, still in Mary's group? Yes Fridah? Is it true class?</p> <p>An antiseptic is used externally to clean wounds for example detol in humans is an antiseptic. Why do you use detol to clean the wounds? Yes! He is saying to prevent bacterias from feeding on the wound. So antiseptics are used externally to clean the wound and prevent the entry of bacterias into the wound for it to heal quickly, you can still use them even in the mouth. But the main use of antiseptics is to prevent the spread of the disease.</p> <p>The last group, which is Muyunda's group, will you please give us what you discussed on 'Disinfectants',</p>	<p>Disinfectants are chemicals which can be used to disinfect animal housing by washing the floor and walls in order to control and kill bacterias.</p> <p>Yes sir.</p> <p>Thank you sir.</p>	
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<p>what are they? Yes Jerry?</p> <p>Okay class is Jerry correct?</p> <p>So disinfectants are chemicals which can be used to disinfect animal housing, so you either wash the floor using chemicals or you wash the walls using chemicals, the main purpose is to control and kill bacterias.</p> <p>You are disinfecting the room where livestock are sleeping, feeding, milked tools and equipment used and so on.</p> <p>Even yourselves in your homes you always clean your kitchen and where you are sleeping using chemicals for example the sunlight soap you use could be one example of a disinfectant because you are using it to clean your home. By so doing you are actually killing the bacterias.</p> <p>Any questions class?</p> <p>Okay time is against us, we will stop here class and there is no</p>		
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	homework for today since the other work is still in the marking phase.		
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Appendix 7a

STIMULATED RECALL

Teacher's name: Mr. B.
School: X Senior Secondary
Subject: Agriculture
Grade: 12
Date: 07/03/2006
Topic: Health and Diseases

Interviewer: Good afternoon Mr. B

Interviewee: Good afternoon sir, how are you?

Interviewer: No I am doing fine,

Interviewee: Good.

Interviewer: Mr. B after having observed your lesson on health and diseases today, I came up with few comments and observations which I would like to share with you. I realised in your teaching, that you used group work, why did you decide to use group work out of all the recommended learning and teaching strategies in learner-centred education?

Interviewee: Thank you very much, I decided to use group work because that could help me to get all the learners involved in the discussion. Group work always help learners to work together, they share ideas in order to come up with proper answers.

Interviewer: Okay, thank you very much, again Mr. B I realised that you also used question and answer strategies, with the assistance of the chalkboard when you were teaching on vaccines, sera, antibiotics, antiseptics and disinfectants, do you think this learning and teaching strategy will help your learners develop a conceptual understanding about these concepts?

Interviewee: Yes that's very true because that allowed every learner to participate. Every learner was involved and their comments were taken and they digested them. So by asking them questions and using the chalkboard to write what they are talking about brings effective learning also. Because these days we talk about learner-centred approach so learners are involved also through questioning and through discussions also will help them digest the topic very well.

Interviewer: Okay, why didn't you bring along with you some samples of the substances that you mentioned to the learners so that they can see them physically?

Interviewee: Unfortunately we are operating in a crisis, we lack resources such as vaccines, sera, disinfectants, antibiotics and other things so this would cost money for the school.

Interviewer: So that's why you decided to teach the lesson theoretically?

Interviewee: Yes.

Interviewer: Okay thank you very much. I also realised that you didn't demonstrate to your learners and make them practice how these substances are prepared and administered into the body of an animal, why did you do this?

Interviewee: That's to ensure how they are applied into an animal because they should know how they are supposed to be administered into the body of an animal. As a teacher it is imperative to demonstrate to them how it is administered and what function it is going to do in the body of an animal.

Interviewer: Okay, Ya it is fine you said demonstration gives learners first hand information and experience on how to execute a certain learning activity, but what I realised is that you did not demonstrate on how these things are administered into the body of an animal and also giving learners a provision of practicing the skill so that learners can learn how to carry out these operations?

Interviewer: Okay a I have indicated earlier on that one could not demonstrate on how to use them because the resources are not available. So it could have been much easier if the resources were available then I could demonstrate and make them practice the skill that is why I had to embark on theory.

Interviewer: So in other words you teachers actually know on how you were supposed to implement your lessons, but because your hands are cut short due to lack of resources, the schools are not providing you with necessary resources as a result you end up teaching your lessons theoretically.

Okay, I see also during your lesson presentation I heard you calling 'bacteria' as 'bacterias' and later on even your learners started imitating you by calling them bacterias, can you just shade light on me why do you call them bacterias?

Interviewee: Well infact, they are not really bacterias because if you talk of one it is bacterium, I think so and many bacteria, but in fact it is just how people express the words.

Interviewer: Okay thank you very much Mr. B, because I was wondering your learners were also calling them bacterias. I hope next time you go back to them and try to remind them pronounce the right word.

Now as you were busy giving the definition of the concept disinfectant, I heard you use the word disinfectant again in your definition, why did you have to do it this way?

Interviewee: In fact it was not a definition but a description of what disinfectant is all about. So we are trying to talk about them being chemicals that are used to disinfect, that means to.....

Interviewer: Now you are putting it in the right way because you are using the word disinfect in your sentence the same thing that I am referring to that you are using the same word in your explanation.

Interviewee: Because disinfectant, now becomes a chemical which is used to disinfect because disinfect now becomes an action word.

Interviewer: Okay, don't you think you should have come up with a different word that emphasises what a disinfectant is without using the word 'disinfect' again. Because to me it is like it may create a problem to the learners since they may still not know what to disinfect is?

Interviewee: Through that explanation that was given to them because when you clean a particular room you use chemicals to clean up them using that chemicals to kill bacterias , bacteriums or viruses or whatever. This means that through explanations you have made it clear to them what a disinfectant is all about. So in my view I think that if you can come up with another term that we can use to make it more clear to them, can you suggest it to me?

Interviewer: Well not necessarily as such, my worry was that the word 'disinfect' was not supposed to come in a sentence but rather you could have used one of the simplest words that can make learners understand the concept itself without using the word 'disinfect'. But all the same the way you have just explained to me it is very clear because you really made sure that learners understand what you wanted them to learn.

Interviewer: Again when you talked about the disease causing organisms, regarding their control much of your focus was on the 'bacteria' leaving out some of the disease causing organisms, why did you have to do this?

Interviewee: The emphasis was also put on viruses and bacteria unfortunately we didn't talk about the protozoa, because most of the diseases which are found in Caprivi are caused by bacteria and viruses. But in general it was made clear to them that micro-organisms cause diseases. In pathogenes we talk about bacteria, the viruses and protozoa.

Interviewer: Okay, I see so what you are trying to tell me now is that you are actually focusing on those disease causing organisms that are prevalent in the environment of the learners.

Interviewee: Yes,

Interviewer: Okay, it is clear now to me, thank you very much for your cooperation with regard to the few questions that I subjected to you and you really handled them to my satisfaction. I thank you for that.

Interviewee: Thank you very much sir.

Appendix 7b

STIMULATED RECALL

Teacher's name: Mr. C
School: X Senior Secondary
Subject: Agriculture
Grade: 11
Date: 08/03/2006
Topic: The Principles of Plant Growth

Interviewer: Good afternoon Mr. C

Interviewee: Good afternoon sir!

Interviewer: Mr. C I have few questions which I would like to get clarity on from you that are based on the principles of plant growth. In trying to illustrate what growth is, why did you choose the 'Zambezi River' and a 'learner sitting and standing up' as a way of guiding learners to the correct answers?

Interviewee: I think the response came from the learner I wanted to challenge his thinking because I realized that there were some directions regarding what the learner

was saying. Now in order to find out whether or not the learner had a clear understanding of the term, that is why I decided to use the given examples.

Interviewer: Okay, I really enjoyed the metaphor the way you used it. It was quite interesting and it was really guiding.

Interviewer: What could be your comment on one of the learners who said, “teacher we know what growth is we only just don’t know how to explain it?”

Interviewee: I think I gave the learner some kind of clue to that one the fact that the learner failed to explain clearly showed that he didn’t just have a conceptual understanding about it.

Interviewer: I see, now you being a teacher, having realized that the learner hasn’t got a conceptual knowledge about what growth is and how to explain it, now how are you going to guide them so that they reach a stage where they are going to explain?

Interviewee: From my own perspective I thought the best way to help these learners understand the point is to guide them by asking them questions until they come to an explanation that is a little bit acceptable.

Interviewer: As you were asking the learners some questions I realized that you were writing all the answers they were giving whether right or wrong on the chalkboard and later together with them you started canceling out the wrong ones and you only remained with only the correct ones, why did you decide to take such an approach?

Interviewee: Sometimes you have to respect what learners might think they know and at the end you decide whether what they know is what really it is this way learners will decide on their own that what they thought they know isn’t correct or it is correct.

Interviewer: After having taught the lesson to your learners the way you did do you think this is the best approach of just teaching it theoretically in class and why?

Interviewee: No not really, because there are many ways a lesson could be approached because when you have learners some learn better by experiencing, some learn better by just hearing from others. Therefore in this approach I might not have accommodated all the learners.

Interviewer: Because I was thinking that may be you could have given your learners some experiments from which they could develop own experience and that they actually see what you mean by growth and so on.

Interviewer: Do you think your learners understand what ‘radiant energy’ is because in photosynthesis, one of the things that you mentioned as a pre-requisite for it to take place is radiant energy?

Interviewee: That is also a problem for conceptual understanding all that they may know is that it is related to energy but what it really is they don't know.

Interviewer: Now how would you make them know that this is what you mean by radiant energy?

Interviewee: I think that one also needs a bit of thorough preparation from the teacher, and then there must be a follow up with some practical activities. From what they are going to observe that might support their understanding of what radiant energy is. The other thing that I realized from my learners especially in this part of the lesson is that they have problems with scientific concepts especially those ones who are not doing physical science, therefore for a teacher of Agriculture and Biology s/he has to dig deeper in order to make learners understand the Physical Science terminologies.

Interviewer: You mentioned quite an interesting thing that you need to provide learners with some practicals so that they can actually see what a teacher is talking about, having seen that I did not see any practical activity being carried out in this class, is there still going to be room for the learners to experience these practicals?

Interviewee: In the actual fact a topic like that one how I used to do it previously when I was still teaching both Agriculture and Biology, I would cover most of the topics in Biology. But now it is a little bit difficult because I am only handling Agriculture and Biology is handled by a different teacher. The other problem we have in our school is the access to the science laboratory which is a bit of a problem because it is used by the whole school for different subjects and this limits our preparations.

Interviewer: As you have already outlined that the laboratory can not cater for all the grades taking science, now what about the apparatus and equipment are they enough?

Interviewee: They are not enough.

Interviewer: During your lesson presentation as well I heard you asking learners what a 'chemical reaction' is, despite your learners getting it wrong, I did not hear you giving them a correct answer on this one, why didn't you do so?

Interviewee: I don't know whether I did not explain that one but I think one learner got it right.

Interviewer: Thank you very much Mr. C

Interviewee: Thank you sir!

Appendix 7c

STIMULATED RECALL

Teacher's name: Mr. D
School: Y Senior Secondary
Subject: Agriculture
Grade: 11
Date: 14/03/2006
Topic: Soil Erosion

Interviewer: Good afternoon Mr. D

Interviewee: Good afternoon Mr. Kasenga!

Interviewer: Mr. D I have few comments and observations that I would like to make pertaining to your lesson presentation for today. When you took out your learners to go and observe the effects of different soil erosion, I realized that you really consolidated the theory learnt in a classroom by providing them with the real life experience which was an excellent move of addressing some of the requirements of learner-centred education. Now if I may ask, how did you come up with such a brilliant idea of presenting this lesson?

Interviewee: Sometimes we share with our friends during meetings so our syllabus also requires us to relate what we learn in books with what we see in nature. So we share ideas on how we can relate the content to what is happening in nature or the environment.

Interviewer: That is beautiful Mr. D now if I may draw your attention to the video that you showed your learners during lesson time, I anticipated that you were going to carry out a similar demonstration in the classroom before taking your learners outside the classroom, why didn't you do this before taking your learners outside the classroom?

Interviewee: I showed them the video to try and arouse their interest; I also wanted them to see how the demonstration is done before they do it. It was going to be easier for them after they had seen how the demonstration is supposed to be carried out before I ask them to do it.

Interviewer: Still on the video Mr.D, why did you use the video show in the lesson as an introduction instead of using it as a summary of your lesson?

Interviewee: I used it as an introduction so that I can capture all their senses that are to visualize and to observe before they read it in their books. It is very important at times to capture the learners' interest in the introduction of the lesson then you will have guided the learners into the content of the lesson.

Interviewer: Thank you very much Mr. D that was an excellent lesson presentation, I really enjoyed it very much.

Interviewee: Thank you sir.

Appendix 8a

SECTION 3 - LIVESTOCK HUSBANDRY

- 3.1 Livestock anatomy**
- describe the structure of the digestive system of a ruminant and a non-ruminant animal (not poultry)
 - describe the reproductive system of a named farm animal (not poultry)
- 3.2 Livestock physiology**
- describe the processes of digestion and absorption in the alimentary canals of a ruminant and a non-ruminant animal
 - describe the processes of mating, fertilisation and birth in a named farm animal (not poultry)
 - define *lactation and weaning*
 - understand the importance of colostrum
- 3.3 Livestock health**
- 3.3.1 Relevant legislation**
- explain the principles behind laws relating to notifiable diseases, the importing and exporting of animals and quarantine (obtainable from local Ministry of Agriculture)
- 3.3.2 Health and disease**
- recognise the signs of health and ill health of ruminants and poultry
 - describe the spread of infectious and contagious diseases in ruminants and poultry
 - explain the importance of livestock hygiene and of the isolation of sick animals
- 3.4 Livestock nutrition**
- describe and explain:
 - the nutritional requirements of animals
 - food materials suitable for the different classes of livestock and their nutritional content
 - feeding practices: including the importance of a balanced ration, maintenance and production rations and the importance of adequate water supplies
- 3.5 Livestock breeding**
- 3.5.1 Monohybrid inheritance**
- define the following terms: *chromosome; gene; allele; homozygous; heterozygous; dominant and recessive;*
 - calculate and predict the results of simple genetic crosses involving 1 : 1 and 3 : 1 ratios
- 3.5.2 Selection**
- understand the role of artificial selection in the production of improved varieties of animals and plants of economic importance
- explain the significance of microorganisms and enzymes in the digestion of a ruminant
 - discuss the advantage of AI
 - Explain how breeding cycles can be managed to increase yields from farm animals
 - describe the use of vaccines, sera, antibiotics, antiseptics and disinfectants
 - describe the veterinary services available locally
 - describe and explain the suitability of the ration to the age and stage of development of the livestock
 - explain the meaning of *genotype* and *phenotype* and assess their importance in plant and animal breeding
 - describe how breeding can improve yield, disease resistance, hardiness, and appearance in named livestock and crops

Appendix 8b

Teachers C + D

TOPIC	GENERAL OBJECTIVES Learners will:	SPECIFIC OBJECTIVES Learners should be able to:
4.2.1.10 Drainage	<ul style="list-style-type: none"> Acquire knowledge of drainage problems and how to solve them 	<ul style="list-style-type: none"> define drainage describe how soil is drained by means of ditches and pipe drains define leaching discuss the effects of leaching on the loss of plant nutrients
4.2.1.11 Irrigation	<ul style="list-style-type: none"> Know the various irrigation methods in Namibia 	<ul style="list-style-type: none"> explain what is meant by irrigation list the irrigation methods applicable in our country discuss of both positive and negative effects of irrigation on crop yield and quality discuss reasons for using water sparingly in Namibia
4.2.2 Principles of plant growth	<ul style="list-style-type: none"> Acquire knowledge and skills on the principles of plant growth in relation to plant structure and physiological processes 	<ul style="list-style-type: none"> state the conditions necessary for plant growth define osmosis as the movement of water molecules from the region of higher concentration to a region of lower concentration through a partially permeable membrane explain the concepts of turgor and plasmolysis describe the ways in which water passes from the soil into plant roots and its movement throughout the plant by vascular tissues in terms of the structure and function of the root tissues, root hairs and water potential define diffusion as a movement of ions and molecules from the region of higher concentration to the region of lower concentration down a concentration gradient describe the ways in which mineral salts are taken up by plants in terms of diffusion and active transport and the movement of mineral salts by xylem vessels describe the absorption of carbon dioxide by leaves in terms of their internal structure and gaseous exchange through stomata describe photosynthesis in terms of carbon dioxide, water, light, chlorophyll, leaf structure and the synthesis of carbohydrates and the production of oxygen define respiration as a release of energy from food substances in living cells with the release of carbon dioxide
		<ul style="list-style-type: none"> define translocation in terms of movement of synthesised

THEME	TARGET DATE	DATE COMPLETED	REVISION	SOURCES
3.3 Livestock health				
Relevant Namibian legislation				
<i>Acquire understanding of relevant legislation relating to livestock and livestock production in Namibia</i>				
Explain the principles behind laws relating to notifiable diseases, the importing and exporting of animals, and quarantine services in our country				
Explain the principles behind the laws relating to livestock products and the accompanying health regulations (obtained from the Ministry of Agriculture in Namibia)				
Health and diseases				
<i>Recognise the signs of health and ill-health of ruminants and poultry</i>				
Identify the signs of healthy and sick animals				
Describe the spread of infectious and contagious diseases in ruminants and poultry				
Explain the importance of livestock hygiene and the isolation of sick animals				
Describe the use of vaccines, sera, antibiotics, antiseptics and disinfectants				
Discuss the veterinary services available locally				

THEME	TARGET DATE	DATE COMPLETED	REVISION	SOURCES
Describe soil formation of any dominant soil types/groups identified				
Explain the Agricultural potential of the different soil groups in terms of fertility and suitability for crop production				
2.1.9 Soil erosion and soil conservation				
<i>Understand the causes of soil erosion and the ways soil can be conserved</i>				
List some examples of soil erosion				
Describe the causes of soil erosion and methods used to reduce erosion				
2.1.10 Drainage				
<i>Acquire knowledge of drainage problems and how to solve them</i>				
Define drainage				
Describe how soil is drained by means of ditches and pipe drains				
Define leaching				
Discuss the effect of leaching on the loss of plant nutrients				
2.1.11 Irrigation				
<i>Know the various irrigation methods in Namibia</i>				
Explain what is meant by irrigation				
List the irrigation methods applicable in our country				
Discuss the positive and negative effects of irrigation on crop yield and quality				
Discuss reasons for using water sparingly in Namibia				

SUBJECTS: AGRICULTURAL PRODUCTION AND FARMING TECHNOLOGY
 LIFE SCIENCE
 NATURAL SCIENCE AND HEALTH EDUCATION
 BIOLOGY

LESSON PLANNING FORM FOR DAILY PREPARATION

DATE	06.03.2006	PERIODS	One period	LESSON TOPIC	
GRADE	12A-C			Livestock Health	
THEME	Livestock Husbandry				
LEARNING CONTENT	LEARNING OBJECTIVES	TEACHING METHOD/S	TEACHING AND LEARNING MEDIA/AIDS		
Health and diseases	By the end of the lesson learners should be able to	Class discussion and questions	Reference materials		
* Signs of ill health	recognise the signs of health & ill health in Ruminants				
* Signs of health in Ruminant and poultry					
PUPIL ACTIVITIES	EVALUATION	HOMEWORK	FOR CASS/NOT FOR CASS		
Learners are able to discuss the topic in their groups.	Assess learners questions	Nil, because the other work is still in the marking phase.	N/A		

Checked
 (HOD) 6/3/06

are your pupil activities depend on discussions?

Appendix 10b

Teacher C

SUBJECTS: ✓
 AGRICULTURAL PRODUCTION AND FARMING TECHNOLOGY
 LIFE SCIENCE
 NATURAL SCIENCE AND HEALTH EDUCATION
 BIOLOGY

LESSON PLANNING FORM FOR DAILY PREPARATION

DATE	05/05/2006	PERIODS	LESSON TOPIC Advantages and disadvantages of Sprinkler and Drip irrigation	
GRADE	11			
THEME	Irrigation			
LEARNING CONTENT	LEARNING OBJECTIVES	TEACHING METHOD/S	TEACHING AND LEARNING MEDIA/AIDS	
The advantages and disadvantages of Sprinkler and Drip irrigation	- Describe the advantages and disadvantages of sprinkler and Drip irrigation	Group discussions + Questions and answer methods + Lecture method	Agric for Southern Africa	
PUPIL ACTIVITIES	EVALUATION	HOMEWORK	FOR CLASS/NOT FOR CLASS	
Pupils discuss the learning content covered e.g. the advantages and disadvantages of sprinkler and Drip irrigation, in groups and report back	Consist of oral and written questions based on the learning content covered e.g. what are the advantages of sprinkler irrigation? what are the disadvantages	State four conditions necessary for plant growth (4)	Not for class	

Appendix 10c

SUBJECTS: AGRICULTURAL PRODUCTION AND FARMING TECHNOLOGY
 LIFE SCIENCE
 NATURAL SCIENCE AND HEALTH EDUCATION
 BIOLOGY

Teacher D

LESSON PLANNING FORM FOR DAILY PREPARATION

DATE	PERIODS	LESSON TOPIC	
TUESDAY 14/03/07	1, 2, 7 and 8		
GRADE	11 A, B + C - AGRICULTURE	Causes of soil erosion and ways of reducing it.	
THEME	Soil erosion		
LEARNING CONTENT	LEARNING OBJECTIVES	TEACHING METHOD/S	TEACHING AND LEARNING MEDIA/AIDS
Soil erosion - removal of soil by running water or wind. Causes: wind, rain, fire, flood, overgrazing.	1. list the some examples of soil erosion.	Question & answer Demonstration Lecture	Chalkboard Textbook Video
Types of erosion: sheet, gully. Prevention: contour, terracing.	2. Describe the causes of soil erosion and the method used to reduce it.	Group discussion	School grounds
PUPIL ACTIVITIES	EVALUATION	HOMEWORK	FOR CASS/NOT FOR CASS
observe the signs of soil erosion in school ground.	oral and written	Suggest and	NOT
Describe the causes of soil erosion.		five ways of reducing soil erosion and thus conserving soil.	
Suggest methods of reducing soil erosion.			

weaning - This is the separation of a young animal from its mother that it no longer have access of getting food/milk that it must ~~take~~ ^{receive} ~~for~~ ^{from} other ~~sources~~ ^{food} sources.

4. cows must ~~right~~ ^{first recover} ~~be~~ and then get ready for the next mating.

5. It is rich in proteins and fats

It is rich in antibodies derived from mother

This help to give a new born animal extra protection against diseases while it is still young.

Contains Vitamin A

#

6. animals who are notified ~~must~~ ^{must} be reported at the nearest veterinary office

Sick animals must be separated

Samples must be ~~given~~ ^{sent} to the veterinary office

7. a. Antibiotics - It is ~~used~~ ^{used} to bring diseases under control.

b. Antiseptics - They are used on the wounds

c. sera - It is used in a preparation of vaccine

8. give advice to livestock farmers.

Sell medicines to farmers

Teach farmers how to vaccinate their animals

Provide building materials.

QUESTION 2

1. g. ↓ water and carbon dioxide is combined using radiant energy from sunlight.

11 Diffusion is the movement of ions and molecule from a region of high concentration to a region of lower concentration down the concentration gradient.

b. ↓ By osmosis ~~is~~ water move from where it is more concentrated to where it is less concentrated. from the soil to the root hair cells.

11, during the night the stomata close and less water will be lost.

during the day the stomata opens and more water will be lost through transpiration.

2. ↓ Photosynthesis is the process by which plants make their own food

word equation

carbon dioxide + water $\xrightarrow[\text{chlorophyll}]{\text{sunlight}}$ oxygen + ~~energy~~ ^{glucose} ~~energy~~.

11 for the green colour in plants

b. Translocation → is the transport of food substance to where they are made

Aim

To investigate and compare the water-holding capacity of different soils

Apparatus and materials

- 4 measuring cylinders (250 cm³); 3 filter funnels and filter papers; 3 soil samples; a balance.

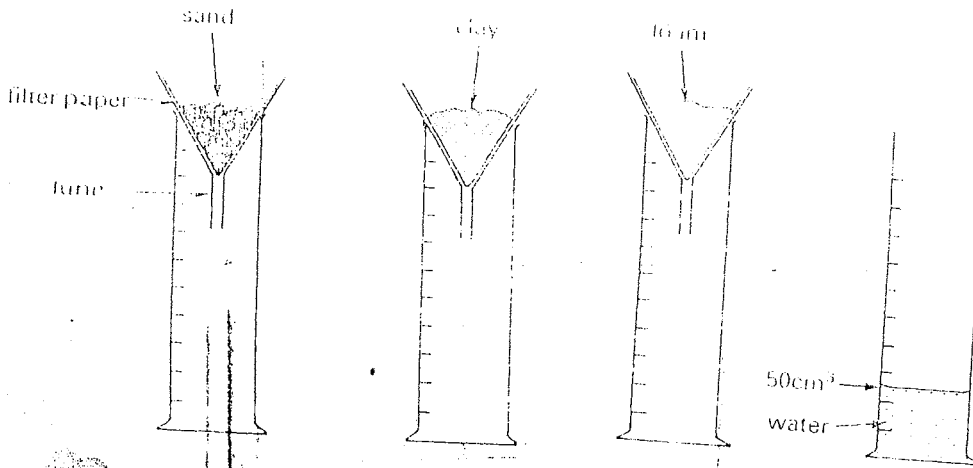


Fig 7.23

Method

- Set up three measuring cylinders and funnels as shown.
- Weigh 100 g of dry sand, clay and loam, and add to the funnels as shown.
- Pour 50 cm³ of water into each of the funnels, and allow it to drain through. Collect the drainage water in the measuring cylinders.
- When drainage is complete, measure the volume of drainage water, and find the volume of water retained, by each soil.
- How would you find this volume?
- Compare the water-holding capacity of the three sides.

Results

- water poured onto soil sample = 50 cm³
- water drained through soil sample = x cm³
- therefore water retained = 50-x = y cm³

Water holding capacity = y cm³ per 100 g of soil

Conclusion

- What do you conclude after comparing the water-holding capacities of these soils?

Further question

- What would be the effect on plants living on these soils if there was no rain for some time?

Type of soil investigated:	
water poured onto soil sample:	
water drained through soil sample:	
water retained by soil:	
water holding capacity:	
Conclusion:	
Drainage:	
EFFECT ON Plant growth:	

Appendix 12a

From: Mr. Kasenga Alfred
P/Bag 1096
Katima Mulilo
Namibia

To: Messrs B, C and D
X and Y Senior Secondary Schools
Katima Mulilo

Date:

Dear Sir,

I am registered for a Master of Education degree (GETP) with Rhodes University. To qualify for this degree, I am required to write a research report that specifically looks at the focus of my research. In this case, I will be expected to answer the following questions, which are my research questions:

- How is Agriculture taught and learnt at Senior Secondary School level within the Caprivi Region?
- What type of resources are used to effectively implement Agriculture in Senior Secondary Schools within the Caprivi Region?

Please complete the attached consent form if you are willing to assist me with this research.

Yours faithfully,

Alfred Kasenga

Appendix 12b

Consent Form

Alfred Kasenga is hereby granted permission to record an interview conducted with me as well as to observe lessons and do stimulated recall with me thereafter as part of his data collection for a research report that he will be writing for the completion of his Master's degree. I am aware that transcripts will be made of the interview and that extracts from these may be used in the final report. I have also been assured that my school as well as those who will be involved shall enjoy anonymity in the report.

Signed: _____ Date: _____

Appendix 13

P/Bag 1096
Katima Mulilo
Namibia
Date

The Principals
X and Y Senior Secondary Schools
P.O.Katima Mulilo
Namibia

Dear Sir,

∴ Request for a research site

I am a part time student with Rhodes University, Grahamstown in the Republic of South Africa. (Student number: 603K4434. I am studying for a Master of Education Degree (GETP). I would be most grateful if you allow me to use your school as one of my research sites for the research report, which I am required to write.

The aim of my research project is to study the teaching and learning of Agriculture at Senior Secondary School level within the Caprivi Region. If I am allowed to conduct my research at your school, the teacher with whom I will be working with, shall be interviewed, and class observations shall be conducted, and after each observation, some discussions (stimulated recall) vis-à-vis the lessons shall be held with the teacher concerned. The interviews, discussions and observations shall be tape recorded for easier access to transcription thereof.

The school and teacher/s concerned are assured of anonymity in the final research report, and the transcription shall be returned to the teacher involved to proof read, edit and make some final comments.

Should you have any questions or concerns about this request, you can contact me at cell No: 0812691725 or 06-253422x112 (work).

Yours Sincerely

Alfred Kasenga

Appendix 5a Teacher B

Caprivi School, P.O. Box 1097, Katima Mulilo, Namibia

	1 06:40 - 07:40	2 07:40 - 08:20	3 08:20 - 09:00	4 09:00 - 09:40	5 10:10 - 10:50	6 10:50 - 11:30	7 11:30 - 12:10	8 12:10 - 12:50
Mo		As 12C	12C			B 11A	As 12A	As 12B
Tu			B 11A	A 10A	As 12B	As 12A	As 12C	
We	A 10A		As 12B	As 12A		B 11A	As 12C	
Th			As 12B	A 10A	As 12A	B 11A	As 12C	
Fr	As 12A		As 12C	A 10A		As 12B	B 11A	

Appendix 15b

Teacher C

Caprivi School, P B

97, Katima Mulilo, Namibia

		2 07:40 - 08:20	3 08:20 - 09:00	4 09:00 - 09:40	5 10:10 - 10:50	6 10:50 - 11:30	7 11:30 - 12:10	8 12:10 - 12:50
Mo		As ^{11C}	LSci ^{10B}			As ^{11B}	LSci ^{10A}	As ^{11A}
		11C	10B			11B	10A	11A
Tu	As ^{11B}		LSci ^{10B}	A ^{10B}	LSci ^{10A}	As ^{11C}	As ^{11A}	
		11B		10B	10B	10A	11C	11A
We	LSci ^{10B}	A ^{10B}		As ^{11A}	LSci ^{10A}	As ^{11C}		As ^{11B}
		10B		11A	10A	11C		11B
Th		LSci ^{10B}	As ^{11A}		A ^{10B}	As ^{11B}	As ^{11C}	
		10B	11A		10B	11B	11C	
Fr			LSci ^{10A}	As ^{11A}	As ^{11C}	A ^{10B}		As ^{11B}
			10A	11A	11C	10B		11B

Appendix 15c

200

PERIODS		1	2	3	4	5	6	7	8	9	10	11	PERSONAL TIME-TABLE
TIME		7:00	7:40	8:20	9:00	10:10	10:50	11:30	12:10				
AYS		7:40	8:20	9:00	10:10	10:50	11:30	12:10	12:50				
	Y												1. Teacher: D
	B												2. School: Y
IN.	E												3. Grades Taught
	M	BIO 12B	AGR 11B	BIO 12C	AGR 11C	AGR 11C	BIO 12A	AGR 11A	AGR 11A				1. 9- Life Skills
	B												2. 11A-C AGRICULTURE
	L												3. 12A-C BIOLOGY
ES.	A												4.
	S	AGR 11B	AGR 11B	BIO 12C	BIO 12C	BIO 12B	BIO 12A	AGR 11A	AGR 11C				5.
	S												6.
D.	A												NB:
	N	AGR 11C	BIO 12C	BIO 12B	BIO 12B	AGR 11B		BIO 12A	AGR 11A				1. Indicate non-promotion subjects.
	D												2. Indicate Extramural activities.
JRS.	E												
	V	BIO 12B	AGR 11A		AGR 11B	AGR 11C	BIO 12A	BIO 12A	BIO 12C				
ID.	O												
	T	AGR 11B	BIO 12A	AGR 11A	BIO 12B		HSK 9	AGR 11C	BIO 12C				

ANALYSIS

1. LIFE SKILLS - GRADE 9 x
2. AGRICULTURE 11A-C x
3. BIOLOGY 12A-C x
4. GARDENING, HIV and AIDS Activities x
5. MUSIC x

2. Teaching periods:

1. Teaching periods per week.....
2. Free teaching periods per week.....
3. Extramural periods per week.....

Appendix 16

National Examination Results (Grade 12) Agriculture-2005 for Teacher B:

(Symbol distribution)

A	B	C	D	E	F	G	U	TOTAL
0	0	4	5	15	6	0	0	30

