COMPARATIVE STUDY OF PERFORMANCE OF MIDDLE AND JUNIOR SECONDARY SCHOOL LEAVERS FARMING IN NORTH TONGU DISTRICT, VOLTA REGION, GHANA

BY

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DECLARATION

I declare that the materials covered in this research document are the results of investigations done by me. Any secondary sources of material or information in this thesis is acknowledged.

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CERTIFICATION

Certified that this thesis is the student's own account of his research.

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DEDICATION

Dedicated first to:

- The memory of the Late Mr. Johnson Kwablavi Kudivo who laid the foundation of my education but left this life too early to realize the fruits of his labours; and,
- My children: Mawunya, Korsi and Da Yawa.

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ABSTRACT

The Study on Basic School Agriculture outcomes was conducted in the North Tongu District of the Volta Region of Ghana from May to June 1998. The main objective of the study is to compare the impact of the differences in the Middle School and Junior Secondary School Agriculture programmes on the performance of the graduates in farming. The Middle School Agriculture programme was vocational/practical without teaching or learning of theoretical knowledge while the Junior Secondary School Agriculture Programme was academic-vocational (Integrated).

Specifically, the study compares and explains the differences between Middle School and Junior Secondary School leavers by: age, gender and marital status, use of school-based agricultural knowledge in home farming while in school, levels of agricultural knowledge, ranking of factors influencing the choice of farming, ranking aims for farming, utilisation of formal agricultural knowledge in farming, achievements from farming, security in life and the needs of the respondents in farming.

The survey research methodology was employed. With a personal interview schedule, the snowball non probability sampling technique was used to gather information from the Middle School and Junior Secondary School graduates farming in the North Tongu District. With questionnaires, stratified random sampling was used to collect information from Agricultural Extension Agents, Junior Secondary School Agriculture Teachers, District Director of Agriculture and District Agricultural Education Officer. The Statistical Package for the Social Scientist (SPSS) was used to analyse the data

The performance of the farmers was compared using the following statistics: percentages, rank scores, The Wilcoxon-Mann-Whitney Test and The Kendall Coefficient of Concordance.

The study shows that Junior Secondary School graduates are better farmers than Middle School leavers in the North Tongu District because their performance is related to the type of Agricultural Education programme they pursued. Junior Secondary school graduates tend to be more independent, think and act abstractly in selecting farming practices that have abstract advantages while Middle School leavers appear to be more dependent and select yield optimising practices with easily observable advantages.

The performance of the Junior Secondary School graduates is explained by their use of school-based agricultural knowledge in home farming while in school, ranking of school training as a factor influencing the choice of farming, ranking of aims in farming, ranking of crop yield optimisation practices and attainment of higher tangible achievements from farming. A similar performance is observed on the basis of gender. However, the perceived levels of security in life and needs of the respondents have not been explained by the differences in the Basic School Agriculture programmes they pursued.

The study provides information on the study of Basic School Agriculture outcomes and the intervening factors in the utilization of formal agricultural knowledge for farming.

CHAPTER 1

INTRODUCTION

1.0 Background to the Study

The performance of the Agricultural Sector in Ghana has not been impressive. The sector operates at 20 percent of its potential with an average annual growth rate of 2.1% (Djangmah, Asiegbor and Aidoo 1997, MOFA 1995). As a result of the low rate of growth, the Ministry of Food and Agriculture has set a target growth rate of four percent per annum in support of Ghana Vision 2020 policy framework (MOFA 1997). Among the reasons cited for low agricultural productivity in the country include low public and private sector investment, poor marketing, low consumption of improved inputs, illiteracy of farmers and low youth involvement, (Djangmah et al 1997, MOE 1986, MOFA 1995).

The Agricultural Sector employs about 70% of the labour force, contributes 40% of the Gross Domestic Product (GDP) and accounts for 50% of export earnings of the country. Several strategies have been developed to improve on the performance of the sector (MOFA, 1995).

One of the key strategies to raise agricultural productivity is the introduction of Agricultural Education and Training into Basic Schools to attract young persons into farming (MOE 1986, Ghanaian Times 1999). The assumption is that literate young persons with higher education and training are strong and energetic and can use their advance knowledge and skills to raise agricultural productivity.

1.1 Development of Basic School Agriculture in Ghana

The need to introduce Agricultural Education as a subject into Basic Education in Ghana was identified as far back as 1922 but it was resisted by the indigenous people who viewed academic education as superior to agricultural education and as a means to escape from drudgery of rural life (Phelp 1922 as cited by MOFA 1996). In that context, Agricultural Education was treated differently in various eras as to be seen in this discussion.

1.1.1 Middle School Agriculture Programme

Prior to 1951 when the Accelerated Development Plan for Education was instituted, agricultural education was mainly administered in schools through pupils participation in manual work in school gardens (GES 1999.) It was noted that most Mission Schools had agriculture as a co-curricular activity but did very little to impact knowledge and skills to pupils.

After independence in 1957, Agriculture was taught in the Middle School as a manual subject, a part of Nature Study. In 1969, the subject was changed into the Continuation programme which was an integration of vocational subjects including carpentry and masonry. The subject was administered in schools through the Agricultural Science Unit of the Ghana Education Service (GES). In the Middle School, the subject had no specified textbook, taught only in some schools and was not examined externally. The Continuation programme continued up to 1987 when the Junior Secondary School programme (JSS) was introduced. The last cohort of Middle School pupils came out of school in 1990. The Middle School agriculture programme was a practical (vocational) one without much theory.

1.1.2 Junior Secondary School Agriculture Programme

In the 1987 Educational Reforms, Agriculture was introduced into Basic Education as a compulsory subject for all pupils. Basic Education in Ghana consists of Primary and Junior Secondary School (MOE 1986). The administration was under a GES Division, Agricultural and Environmental Studies Division which was dissolved in 1992.

In the Primary School, Agriculture is studied as a part of general education. The subject is taught with prevocational objectives in the Junior Secondary School (MOFA 1989). In both cases the curriculum is developed centrally and distributed to all schools in the country irrespective of the environmental conditions where schools are located (CRDD 1987). The prevocational objectives of the Basic Agricultural Education programme read as follows:

1.1.3 Objectives of Junior Secondary School Agriculture Programme

The general objectives of the JSS Agriculture programme as contained in the suggested syllabus include:

1. To train students in the basic principles of agriculture.
2. To provide avenues for the development of skills and change attitudes towards agriculture in young children.

1.1.4 Specific Objectives of Junior Secondary Agriculture Programme

The specific objectives of the JSS Agriculture programme as culled from the 1987 Agricultural Science syllabus read as follows:

1. To develop in the student an appreciation for agriculture in relation to his daily life, his school, his village, or town and his country.
2. To acquaint students with the fundamentals of modern farming.
3. To encourage students in the scientific observations and theories required in understanding the soil, climate, plants and animals.
4. To provide environment where students acquire effective knowledge in:
    i. producing farm commodities efficiently,
    ii. marketing farm products,
    iii. conserving soil and other natural resources,
    iv. participating in rural leadership and
    v. maintaining healthy environment.
5. To develop in the student an understanding of the place of agriculture in the economy of the individual as well as the nation.
6. To contribute to the general education of students and develop a better citizenship in the sense that they have a better understanding of agriculture and the rural community.
7. To prepare the pupils for further training in agriculture.

1.1.5 Evaluation of Basic School Agriculture in Ghana

The Middle School Agriculture programme was not examined externally. The Middle School Leaving Certificate Examination (MSLC) did not include Agriculture as well as the Common Entrance Examination (CEE) which was used to select pupils for entry into Secondary Schools.

In the Educational Reforms, however, two main strategies have been developed for assessing pupils' achievement. First, Continuous Assessment, a type of formative

evaluation was initially set at 40 percent but reduced to 30 percent to ensure that the Continuous Assessment scores do not reduce the quality of the certificate obtained at the basic education level for its invalidity and unreliability (WAEC, 1994). Secondly, a terminal examination was also increased from 60 to 70 percent accordingly. On completion of the JSS, a summative evaluation is done which results in the award of Basic Education Certificate. The grades of the Basic Education Certificate Examination (BECE) are: 1- 6, credit, 7- 8, pass and 9, fail.

Thus, it can be concluded that the JSS Agriculture is an academic-vocational or (Integrated) programme (Curtis, R., F. and Crunkilton, J., R. 1993).

1.2 Second Cycle Agricultural Education

During the Middle School era, pupils who passed the Common Entrance Examination (CEE) were admitted into Secondary Schools. Between 1985 to 1990 only 26 percent of the pupils who passed the Common Entrance Examination from Middle Schools and Preparatory Schools were admitted into Secondary Schools (MOE 1986) because there were not enough Secondary Schools to absorb them.

In the Secondary Schools, Agriculture was taught as part of a general programme for students from form one to form three. Thereafter, students selected subjects they studied for their careers and Agriculture was one of them.

In the Educational Reforms, however, Basic Education Certificate Examination (BECE) which is taken at the end of Junior Secondary Form Three is used to select pupils into Senior Secondary Schools.

At first, to admit a Junior Secondary school graduate into a Senior Secondary School, a student was expected to make an aggregate of thirty-six (36) in six subjects

including Mathematics and English. In the case where a student obtained grade eight (8) in English but his or her aggregate adds up to 36 admission was offer such candidate for an Elective programme at the Second Cycle Educational level (GES 1988).

With tome however, the entry requirements for Senior Secondary School admissions were changed in 1998. Currently, the requirements for admission into Senior Secondary School is aggregate 30 from six Junior Secondary School subjects.

The main continuing education programme for students who want to study Agriculture at the Senior Secondary School level is the Elective Agriculture programme. A total of 30% of the students from the JSS are absorbed annually at the Second Cycle Educational level (GES, Basic 1989). As much as 70% of the students terminate their education and can enter into apprenticeship or hunt for jobs in the private sector. Obviously, a significant proportion of them will earn their living from agriculture (World Bank 1989).

1.3 Statement of the problem

There have been arguments that a practical Basic School Agriculture programme can make better farmers than an academic-vocational (theoretical-practical) Basic School Agriculture. The Middle School Agriculture programme was a practical one while the Junior Secondary School Agriculture programme is both academic and vocational. The two types of Basic School Agriculture programmes have been run for several years in Ghana and the graduates of the respective programmes are involved in farming. But what remains undetermined is the extent to which the differences in the Basic School Agriculture programmes pursued by Middle School and JSS graduates

affect their performance as farmers. Does a practical Basic School Agriculture programme make better farmers as compared to an academic-vocational Basic School Agriculture programme? What effects have the different Basic School Agriculture programmes made on the graduates in farming?

1.4 Research Question

The fundamental question that the study seeks to address is:

Does any difference exist in the performance in farming between graduates of a practical Basic School Agriculture programme and those of an academic-vocational Basic School Agriculture programme?

The specific questions to be addressed are:

1. What social characteristic differences exist between 1985-1990 Middle School and 1990-1997 Junior Secondary School graduates farming in the North Tongu District?
2. How does the use of school-based Agricultural knowledge in home farming while in school associate with the type of Basic School Agriculture programme pursued?
3. How does the level of new agricultural knowledge retained for farming associate with the type of agricultural education received by the Middle School and JSS graduates?

1.5 Objectives of the Study

The main objective of the study is to compare the effects of the differences in a practical and a comprehensive Basic School Agriculture programmes on the performance of Middle School and JSS graduates farming in the North Tongu District.

Specific objectives

Specifically, the study will:

1. identify the social characteristic differences between the Middle School and Junior Secondary School graduates farming in the North Tongu District.
2. compare the extent to which the differences in the programmes influence their use of school-based agricultural knowledge in home farming while in school.
3. compare the retained agricultural knowledge levels of Middle School and Junior Secondary graduates farming in the North Tongu District.
4. compare the factors which influenced the Middle and Junior Secondary School graduates to become farmers in the District.
5. compare the aims of the Middle School and Junior Secondary School graduates in farming in the District.
6. determine and explain the extent to which the differences in the two programmes influence the levels of new agricultural knowledge utilization and achievements in farming of the Middle School and Junior Secondary School graduates in the District.
7. compare the factors which hinder the progress of Middle School and Junior Secondary School graduates farming in the district.
8. suggest interventions for applying relevant aspects of the findings of the study in improving Basic School Agriculture in Ghana.

1.6 Significance of the study

Education is an important tool for development but it is also expensive. It is necessary to find out the effects that a practical and a comprehensive Basic School Agriculture have on the graduates in agricultural production to provide insights into the agricultural

education outcomes and inform policy makers, stakeholders and the public. The findings will guide in the selection of the design of Basic School Agriculture for effectiveness. The findings will also enable support programmes to be developed for Basic School graduates in farming. Since young people form the future human resource base of the country, how they use knowledge acquired from Basic School Agriculture programme should be known so that improvement can be made to the educational programme. The study will contribute to knowledge on how young people utilise formal agricultural knowledge acquired from Basic School in farming, the constraints they face and what they need to improve on their performance. The results will provide a rational basis for improving on the Basic Agricultural Education programme and for the development of programmes for Basic School leavers.

1.7 Definition of terms

The terms listed below have been operationally defined as follows:

1. New Agricultural Knowledge. This refers to formal agricultural knowledge, attitudes, skills, technologies, practices and information which young people acquire at school rather than outside school. It contrasts with Indigenous, Traditional or Local Agricultural Knowledge and Cosmovision which are often acquired through social experience and not taught in formal educational institutions.
2. Performance. It refers to the effects of applying any type of agricultural knowledge in carrying out tasks or activities in the process of raising crops and animals on the farmer and associated achievements. It also includes reasons associated with the choice to use such agricultural knowledge for farming.

3. Utilisation of New Agricultural Knowledge. This is the choice of expressing formal agricultural knowledge, attitudes and skills in carrying out farming activities rather than using other agricultural knowledge systems.
4. Young Farmers. The term refers to people in the age range of 15 to 34 years, who terminated schooling after leaving Middle School and Junior Secondary School between 1985 to 1990 and 1990 to 1997 respectively and farm in the North Tongu district.

1.8 Scope of the Study

From 1985 to 1990, 74 per cent of the six batches of Middle School leavers joined the agricultural labour force since only 26 percent of them went to Second Cycle Educational system. The first batch of JSS graduates completed school in 1990. By 1997, eight cohorts of graduates have passed through the system. The further education programmes designed for the graduates absorbed only 30-40 percent of them into Senior Secondary, Technical and Vocational Schools. In absolute terms, the number of graduates from the Junior Secondary Schools by 1998 is 1,681,532 (GES 1998). Assuming that the reform absorbed about 30 % into Senior Secondary Schools, then there will be 1,177,072 graduates available for the informal sector training institutions and employment. If it is assumed that 5% of them go into apprenticeship training as carpenters, masons, tailors, dressmakers and the like while a further 5% go into trading and allied jobs, then the agricultural sector will have more than one million young persons for employment.

The question is where are these potential prospective farmers located? However, anecdotal information indicates that many Junior Secondary and Middle School graduates farm in the southern part of the Volta Region. North Tongu District is the

largest of the five districts in the southern portion of the Volta Region with vast agricultural potentialities. Since the specific locations of the young farmers have not been identified, it is considered necessary to restrict the study to the North Tongu District for logistic and linguistic reasons as well as knowledge of the area.

The study could not apply a formal testing procedure to identify the agricultural knowledge levels of the young people hence the use of objective test items which are orally administered.

CHAPTER 2

CONCEPTUAL FRAMEWORK

2.0 Concepts guiding the study

This chapter is a review of related literature from which the concepts underlying the study have been identified and operationalized. It defines new agricultural knowledge and discusses the concepts and sub-concepts in the process of the utilizing new agricultural knowledge for farming.

2.1 Meaning of New Agricultural Knowledge

Basic School Agriculture provides new knowledge, attitudes and skills in agriculture. Since agricultural knowledge is multifaceted, and the education system did not separate indigenous knowledge from non-indigenous system in the curriculum, an attempt is made to explain the concept of new agricultural knowledge as applied in the study. Knowledge was classified by Haverkort et al (1999) into four main categories namely; classical knowledge, Rural Peoples' knowledge, formal knowledge and cosmovision. The various dimensions of knowledge as defined by Haverkort, Hiesmstra and vant' Hooft (1999) are presented as follows.

Classical Knowledge. This refers to "knowledge of ancient cultures derived from classical texts or other cultural expressions such as designs or architecture……" (p.4). Rural People's Knowledge. "the actual knowledge of rural people based both on traditional knowledge (knowledge that was transmitted orally from one generation to the next or indigenous knowledge(knowledge that has been generated by a certain population in a specific environment) and external knowledge (i.e. knowledge brought

by education, extension, churches, mass media or commerce)". (p.4).

Cosmovision. "or concept of life refers to the way a certain population perceives the world and cosmos. It includes assumed relationships between the spiritual world. It describes the role of supernatural powers, the relationships between humans and nature and the way natural processes take place. It embodies the premises on which people organise themselves and determine the philosophical basis for intervention in nature". (p.4).

Formal Knowledge. "also referred to as western, scientific or conventional knowledge. Knowledge that results from the formal process of fact finding and understanding, based on positivist methods like quantification and interpretation of research data. This knowledge is being generated in formal research centres and taught in formal educational institutes such as universities and agricultural schools".(p.4).

This study focuses on the utilisation of formal agricultural knowledge which is referred to as new agricultural knowledge.

2.2 Utilisation of New Agricultural Knowledge

In the process of utilising formal agricultural knowledge for farming, several intervening factors impede or enhance the process and ultimately determine the level of usage and outputs of using the knowledge,(Sibylle 1995).

The intervening factors in the process of using formal agricultural knowledge for farming include the characteristics of the new agricultural knowledge itself, characteristics of the learner, the perceived value the learner places on the new knowledge, the method of acquiring the new knowledge, the societal value for the

use of the new knowledge, the support system put in place for the use of new knowledge, socio-cultural factors such as beliefs and taboos, physical, climatic and social factors in the agricultural production environment, the advantage of using the new knowledge as compared to the use of an alternative knowledge in the performance of the same task in farming and the achieved value or satisfaction derived for using the new knowledge.

The main concept underlying the study is the effect of utilising New Agricultural Knowledge in the process of farming. It has three sub-concepts, namely;

(i) compatibility of new agricultural knowledge to farming tasks.

(ii) influence of intervening factors in the process of utilising new agricultural knowledge for farming.

(iii) the magnitude of the satisfaction derived from utilising new agricultural knowledge for farming as well as the desire to use or not to use the new knowledge again.

The sub-concepts compliment, supplement or compete with each other in the process of using new agricultural knowledge for farming. In all, the three sub-concepts provide insights into the phenomenon of applying new agricultural knowledge for farming by young low-resource people. A suggested frame of the factors and stages in the process of using new agricultural knowledge is presented in Figure 2.1.

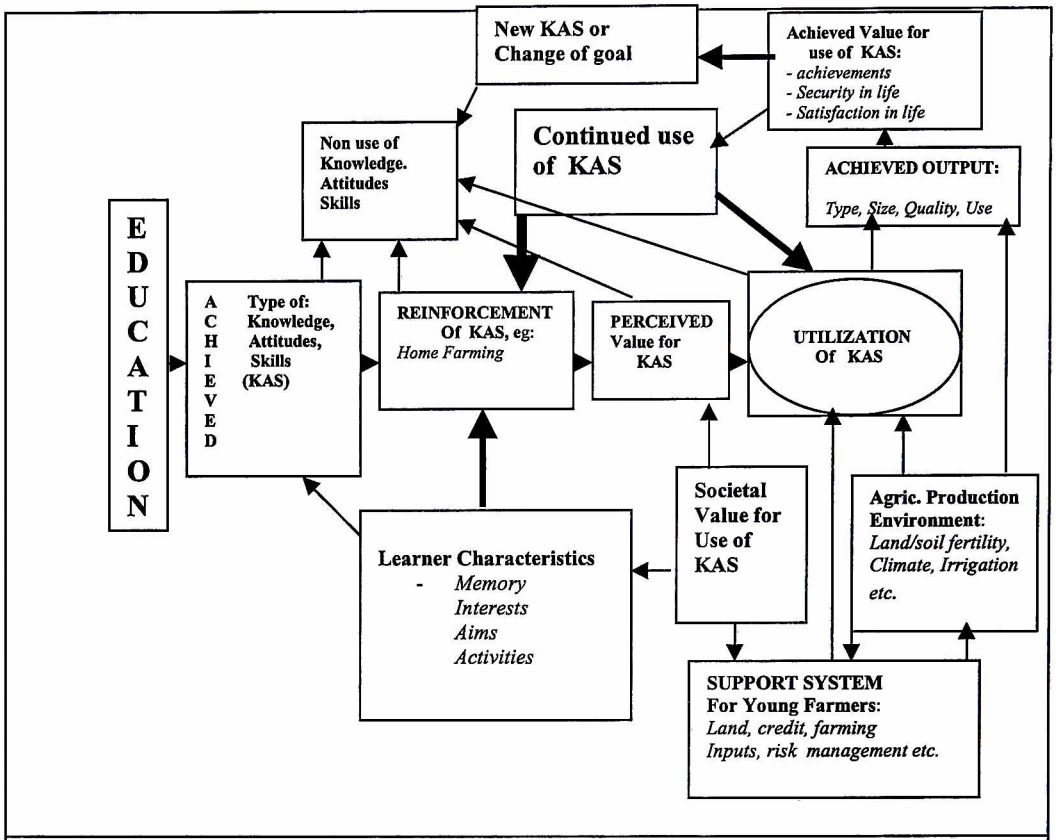


FIGURE 2.1: A SUGGESTED MODEL OF UTILISING AGRICULTURAL KNOWLEDGE FROM BASIC EDUCATION FOR FARMING.

Source: Developed by the study from the literature.

The model suggests that the type of knowledge, skills and attitudes achieved from Basic School Agriculture depend on the type of programme, the learner and his or her characteristics particularly the learner's memory, aims and interests. If the learner uses the knowledge acquired from Basic School Agriculture in farming at home for instance s/he will develop value for the knowledge and internalise it. The reverse is also true. The value so developed for use of new

knowledge would spur the learner on to apply the knowledge in out-of-school farming. However, this will depend on the societal value developed for the persons already using similar knowledge for farming. The lower the societal value for those using the knowledge, the lower the perceived value for the new knowledge. Out-of-school new knowledge utilization in farming depends on the support system put in place for young farmers as well as the agricultural production environment. Continued use would be made of the new knowledge if the farmer achieves high level of satisfaction from the use of the knowledge. The farmer would stop using the new knowledge if his or her goals change or another new knowledge or technology comes to replace the former

2.3 Aspects of farming investigated

From the model on the utilisation of new knowledge from Basic School Agriculture, the study assesses the performance of Middle School and Junior Secondary School graduates in four main aspects of farming as shown in the Figure 2.2.

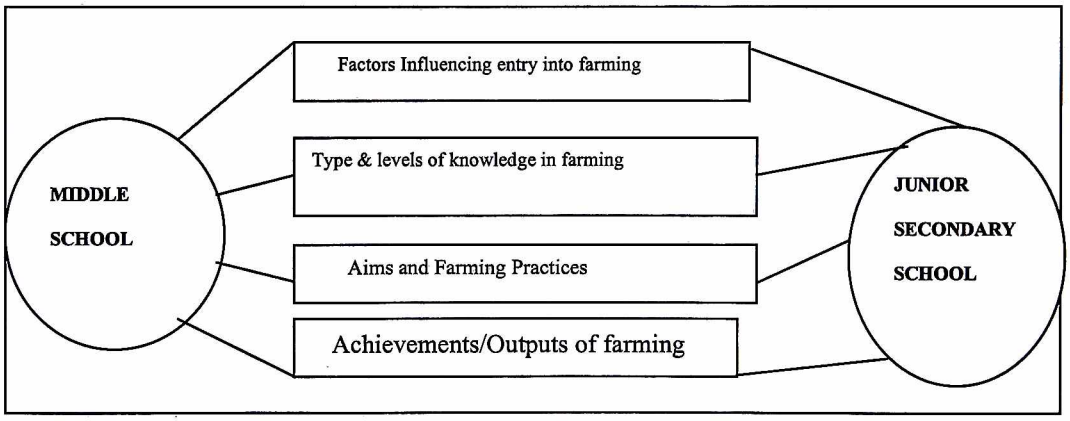


Figure 2.2: Aspects of farming investigated for Middle and Junior Secondary School graduates.

Source: The Study

2.4 Selecting Farming as a Career

It may be interesting to find out the factors which influenced the young people to select farming as a career in the first place. Literature on career selection is presented as follows. Levinson's (1986) life course theory suggests that an individual goes through several eras of growth in a life cycle. Within each life cycle era, the individual enters five developmental tasks.

Two of the tasks which relate to this study are forming and modifying ones dream of life, and an occupation. He indicated that the dream directs ones decision-making to move in certain ways and not in others. Boyd (1989) explains that to understand what motivates an individual to select an occupation requires a determination of the meaning that person attaches to the developmental task of forming and modifying an occupation. He indicated that the process of selecting an occupation is influenced by the era or period of life the individual is going through. These eras identified by Levinson (1986) spans the period of birth to death. Three of the eras are pre-adulthood, early adulthood (years 17- 45), middle adulthood (years 40-65) and late adulthood. It was noted that transition periods exist between these eras of growth in an individual's life cycle.

Important factors that influence selection of an occupation are the education one receives in early life, security in life and value that society attaches to the occupation (Finch and Crunkilton 1993 Chaplin and Krawiec 1974, Chitambar 1972).

One of the higher needs of an adult is to select an occupation that will guarantee a secured future, (Chaplin and Krawiec 1974). But do the Middle School and JSS

graduates in the North Tongu District consider farming as an occupation that can guarantee a secured future for them?

2.4.1 Attitudes of Ghanaians towards farming

The World Bank, (1989 and Foster 1979) indicated that historically, Ghanaians have had a strong support for academic education as against vocational education. They viewed academic education as the gateway for their children to gain access to prestigious professions, (World Bank 1989). In recent years however, there is a gradual change in expectations since the links between academic education and public wage sector employment has broken down (MESW 1998, World Bank 1989). Apparently, some parents began to value vocational education (MESW 1998 and World Bank 1989).

2.4.2 Adjustment to frustration

When an individual's goals and wishes are blocked by circumstances beyond solution, a frustrating situation arises (Chitambar 1972). Chitambar continued to say that the individual makes adjustment in behaviour by redirecting his or her energies and actions into developing new goals, a process called compensation. Two mechanisms in compensation are substitution and sublimation. In substitution, the frustrated individual replaces the original goal with a closely related one (Chitambar 1972). But in sublimation, an individual faced with a frustrating situation replaces a high goal with a lower one.

Two years after the commencement of the 1987 educational reforms in Ghana, the World Bank (1989) reported that in-school youth, parents and teachers in South East Ghana including the study area expressed positive attitudes towards self-employment in the informal sector, including farming.

But a contrary evidence on the ground showed that Ghanaian youth regarded farmers as poor people (Odoi 1999). Did the young out-of-school youth select farming out of interest or frustration?

2.5 Effects of schooling on farming

Schooling is supposed to alter the way farmers think about and solve agricultural problems, (Eisemon and Nyamete 1988). It provides skills for processing information from printed materials and other sources. Eisemon and others (1988) argued that one major intention of education is to influence how daily life events are to be understood, explained and how farmers relate them to their work.

School agricultural education is designed and implemented with the ultimate aim of creating capacities for knowledge-based behaviours in children towards agricultural production. As an aspect of the ideology of the modernisation process in development planning, deliberate change is effected in traditional agricultural beliefs and practices through school agricultural education systems by use of metropolitan languages which de-emphasise Indigenous Agricultural Knowledge Systems, (Eisemon and Nyamete 1988). Wallace, Mantzou and Taylor (1996) stressed the need to integrate indigenous and empirical science-based agricultural knowledge systems for effective education.

The mechanism through which schooling is expected to affect the performance of farmers was outlined by Eisemon and Nyamete (1988) as follows:

- "understanding modern agricultural technologies and incorporating them into agricultural production practices and into the knowledge they possess from social experience..... use they make of school knowledge of science and agriculture and comprehension and use of numeracy skills in the performance of tasks in farming", (p.35).

2.6 Characteristics of Knowledge

Educational objectives have been categorised into three domains, cognitive, affective and psychomotor (Bloom 1956). Knowledge is one of the cognitive outputs of education. It has been classified by Bloom (1956) into six hierarchical levels namely; Knowledge, Comprehension, Application, Analysis, Synthesis and Evaluation. Each of these levels of knowledge has distinct characteristics.

Factual Knowledge is the lowest level and evaluation is the highest. in agricultural education. Other scholars also referred to cognitive educational objectives as "cognitive outputs" (Eisemon and Nyamete 1988) and "profile dimensions" (Quansah 1996). Based on profile dimension classification, agricultural education objectives consist of Knowledge and Understanding (KU), Application of Knowledge (AK) and Practical Skills (PS) (Quansah 1996).

2.6.1 Attitudes

The affective domain of educational objectives which was developed by Krathwohl (1958) consists of five hierarchical levels namely; Receiving, Responding, Valuing, Organisation and Characterisation by value or Value Complex. The affective domain is related to attitudes.

The summaries of definitions of the concept of attitudes seem to agree that an attitude is a disposition or an inferred factor within the individual which produce a tendency to perceive and react favourably or unfavourably towards aspects of ones environment. It is the sum total of ones inclinations, feelings, prejudices, bias, fears, perceptions and convictions about objects, ideas, or issues which can be expressed overtly or covertly

(Osgood et al 1957, Allport 1967, Mouly 1968, and Fishbein 1971). Though attitudes are enduring they are subject to change (Hallaran 1967).

Attitudes have cognitive, affective and behavioural components. The cognitive components of attitudes are knowledge-based and form the foundation of beliefs which make people tell whether an object or idea is bad or good. The affective domain of attitudes refers to the emotions of like or dislike which charge an individual towards an object, idea or issue. The behavioural component of attitude is the overt or covert action or feeling of the individual towards an attitude object, idea or issue. Although behaviour is related to attitudes, other external, social and physical conditions can determine behaviour (Hallaran 1967).

2.6.2 Attitudes in Agriculture

Some curriculum experts do not consider attitudes as important components of agricultural education objectives (Quansah 1997, personal communication). But Phipps (1966) and Warner (1986) identified attitudes as major components of agricultural education.

Since agricultural production can impact positively or negatively on the environment, farmers need to have desirable attitudes for the protection of the environment. In modern times, owing to rapid social and technological changes, new attitudinal issues in agricultural production and consumption have emerged. Some of these attitudes include identification, recognition, valuing and action to be taken in respect to importance of agriculture in national socio-economic development, roles of women and other vulnerable groups in agricultural production, agricultural production practices that degrade, protect and conserve the environment, farm safety measures, co-operation between various actors in the management of the environment, observation of

agricultural product quality standards, protecting agricultural product consumers from zoonotic diseases such as Anthrax, Rabies, Mad Cow disease, improved farming practices, love and respect for dignity of labour in farming, discarding beliefs and taboos that hinder agricultural development, substance abuse in farming, hard work, endurance and resilience in farm work , (Johnson 1990). Other attitudinal issues in agricultural production include labour and personnel handling in farming, and the roles of science, social science and technology in agricultural production, (Taylor 1996).

2.6.3 Skills in Agriculture

Psychomotor objectives in education are made up of five hierarchical levels: Perception, Set, Guided Response, Mechanism and Complex Overt Response. Though they relate to skills, skills have quite distinct characteristics which embodies knowledge as well, (Bajah 1990). Skills in agriculture have been further classified into several groups: practical skills (Pierce 1985), problem-solving skills (Swanson and Claar 1984), manipulative skills (Olaiton and Onazi 1989), responsibility skills (Warner et al 1986), managerial skills or production oriented management skills, (Riedmiller 1990). Again skills have been categorised into transferable skills, problem-solving skills, communicative skills, decision-making skills and management skills (Wallace et al 1996).

In developing formal educational programmes such as curriculum planning, instructional design, teacher preparation, programme implementation and evaluation, various individual aspects or combinations of aspects of these learning taxonomies are used. (Walkinshaw 1989).

In syllabus planning for instance, the type of learning outcomes expected of the programme are specified in the objectives and weighted based on learning taxonomic levels. Specific behavioural terms or active verbs are used to express the learning objectives of the programme (Quansah 1996, Chiwona 1990). The objectives in a syllabus determine content to teach, activities learners must perform and the method the acquired behaviour can be assessed (Sarr 1990).

The complexities involved in integrating the various learning taxonomies and levels led to the curriculum development process to look at learning objectives in terms of the functions or activities an individual performs which are expressions of knowledge, attitudes and skills, (Quansah 1996, Sarr 1990). It has also stimulated a search for new ways of categorizing educational objectives. This led to the development of the experiential learning model and taxonomy of educational objectives by Steinaker and Bell (1979) as cited in Walkinshaw (1989).

The experiential taxonomy consists of five hierarchical levels with sub-levels or steps. Exposure is the lowest level in the experiential learning taxonomy followed by Participation, Identification, Internalization and Dissemination. The experiential learning taxonomy merges the cognitive, affective and psychomotor domains of learning. It also recognizes dissemination of acquired experience as part of the learning process (Walkinshaw 1989).

2.6.4 Summary on characteristics of Agricultural Knowledge

In summary, what the four typologies of learning seem to suggest is that there are different types of knowledge, attitudes and skills, and any meaningful educational programme integrates and incorporates the various types of educational objectives

into it. The proportions of knowledge, attitudes and skills in a training programme determine the practical and or theoretical nature of it.

The components of an educational programme consists of the curriculum, human and material resources, the school or learning environment, the socio-cultural system, characteristics of learners as well as the process of implementation and management of the programme (Wallace et al, 1996 and Taylor, 1996). The programme determines the type of knowledge acquired. The strengths or weaknesses of an educational programme can result from the differences in the combinations of the individual learning taxonomic levels and balance between the three types of learning taxonomies included in the programme.

No matter the combinations of educational objectives achieved through a learning process, the fact remains that whatever is learnt can be forgotten.

2.7 Learning and Forgetting

The Middle School and Junior Secondary School graduates farming in the North Tongu District have all terminated formal schooling between 1-13 years at the time of the study. They could reproduce the knowledge acquired from school if they retained such knowledge in their Long-Term Memory (LTM) or in the Short-Term Memory (STM) any of the knowledge acquired from social experience just a few days before the oral test. The theory of retention and forgetting in verbal learning discussed by several persons and cited by Chaplin and Krawiec (1974) and Von Runkel (1986) explains the situation of the farmers. The elements of the theory of retention and forgetting of learning which relate to the study include:

- Learning which is not used fades through metabolic changes in the cerebral cortex of the brain but knowledge that is used is reinforced and can be remembered, recalled and reproduced.
- Memories undergo systematic changes with the passage of time.
- Interference effects; namely retroactive and proactive inhibition determine level of retained learning.
- Methods of measuring retained learning determine level of retention of knowledge. The six methods of measuring retention of knowledge namely; recognition, relearning, reconstruction, written reproduction and anticipation affect the amount of knowledge retained and reproduced.
- Knowledge retained in the Short-Term Memory (STM) fades earlier than learning stored in the Long-Term Memory (LTM) (Von Runkel 1986) and;
- Knowledge which is not acquired cannot be reproduced.

The implication is that respondents who left school earlier would be expected to loose more of the knowledge they acquired from school than those who left school later. The two methods of measuring retained knowledge discussed by Chaplin and Krawiec (1974) are recognition and reconstruction.

2.8 Competence in Farming

Competence refers to the ability to do something properly and professionally. The ability to engage and perform successfully on a career is best identified from tasks performed on the job (Crunkilton and Finch 1993). It implies that tasks in farming enterprises can be identified by examining on-farm agricultural occupations (Marger and Beach Jr.1967).

Since the school leavers engaged in on-farm agricultural occupations, literature is reviewed to highlight some of the tasks in on-farm agricultural occupations.

2.9 Classification of Occupations in Agriculture

A vocation is defined as a person's trade or profession while an occupation is defined as that which occupies one's time either permanently or as a hobby (Hornby, Cowie and Gimsou 1988). Thus, vocational agriculture education programme enables learners to practise agricultural vocation or occupations as their trade, profession or hobbies.

Agricultural occupations are categorised into two: off-farm agricultural occupation and on-farm occupations (Harold and Carsie 1970). Off-farm agricultural occupations involve agricultural production activities that are not necessarily carried out on a farm. On-farm agricultural occupations require the farm environment for the activities to be carried out in raising crops and animals.

2.9.1 Structure of on-farm occupations in Agriculture

Agricultural occupations are made up of specific agricultural vocations or jobs. A vocation is identified by a job or occupational title, (Marger and Beach Jr. 1967, Ivor 1973, Goodgame 1981, William 1982, Finch and Crunkilton 1993). Job titles identify individuals and the associated roles they play in practising an occupation.

Job titles of on-farm occupations can be identified by examining the ownership systems of farming enterprises. The two types of farm ownership systems are public and private, (Johnson 1990). Examples of public farm ownership systems are co-operatives, state farms, collective farms and public corporations (Johnson 1990).

Private farm ownership systems include Company farming, Partnerships and Sole Ownership, (Johnson 1990).

Job titles such as Farm Hand, Cattle Stockman, Farm Supervisor and Farm Manager are occupied by individuals in public farm ownership systems as well as company farming and sometimes partnerships (Addo-Quaye 1994).

The job titles in public farm enterprises, as well as partnerships and company farming are in clusters arranged hierarchically. Farm Hand is the lowest, Farm Supervisor is middle level and Farm Manager is top level. The individuals who occupy these positions and perform the ascribed roles are wage or salary earners. The knowledge, attitudes, skills and competence required for the above jobs are not the same. The implications of the above to occupational structure is that curriculum can be designed to target the lowest jobs as entry points to enable learners get, keep and advance in the jobs to higher levels (Warmer et al 1986).

In contrast, sole ownership has the same person occupying the various job titles and performing the roles of farm hand, farm supervisor and farm manager. The sole owner is a self-employed farmer who plays the role of a farm manager, (Johnson 1990). The farm manager makes his or her own decisions and change policies as and when he or she desires (Johnson 1990). The foregoing indicates that knowledge, attitudes and skills required by a self-employed farmer are not the same as those needed by a farm hand. The self -employed farmer requires knowledge to operate as a Farm Hand, Supervisor and Manager on his or her own farm.

2.10 Managerial Effectiveness

Managerial effectiveness is defined as the level of achievement of business objectives,

(Johnson 1990). Successful results of commercial farmers are achieved by 'good management - not luck', (Johnson 1990). The main factors affecting managerial effectiveness have been summarised by Johnson (1990) as follows: experience, education and training, personal characteristics, development of managerial skills, and age. The best small-holder farming results are shown by those farmers who have had a wider world experience by travelling, than those who practised locally accepted norms in farming (Johnson 1990). The use of new methods in farming is shown by highly educated farmers than those low in literacy. Personal characteristics such as willingness to work hard, courage to invest, innovate and expand business, toughness, self-confidence, honesty, integrity, ability to inspire other people, resilience to try again even if one experiences failure and good health are pre-requisites to managerial effectiveness (Johnson 1990). Managerial skills are best developed through experience, observation, analytical ability, decision-making and communication skills. Age is an important factor affecting managerial effectiveness. Most people are known to go through three phases; the learning period, full maturity and top performance (years 45-54), and post-maturity or pre-retirement period when individual goals change.

Young men with growing families tend to be more effective managers whereas old men reduce in effectiveness in management due to the change in their goals (Johnson 1990). Managerial effectiveness also vary with the kind of job, the proportion of technical content and human relations in it, (Johnson 1990).

In summary, the literature reveals that, to make new agricultural knowledge, attitudes and skills compatible with farming tasks graduates of the programme are expected to perform, involves identifying the specific occupational titles the students

will engage in after completion. It helps in determining the level of exposure to be given the students and consequently the content to include in the curriculum. Based on occupational clusters, the curriculum design strategy features the lowest jobs first, retaining the middle and top level occupations for higher education and training, this ensures vertical job mobility of the graduates (Warmer et al 1986).

On the other hand if self-employed farmers are the target of the Basic Agricultural Education programme then all the roles expected of self-employed farmers need to be covered. Such a goal appears to be ambitious for Basic Agricultural Education (Sibylle and Riedmiller 1991).

2.11 Intervening Factors and Utilization of New Agricultural Knowledge

The interactions between the various factors affecting the use of new agricultural knowledge in farming have been extracted from several sources and presented as follows. In this section, knowledge is used to include attitudes and skills. The intervening factors are listed and described with the interactions between themselves and the effects they have on process of using new agricultural knowledge.

2.11.1 Compatibility of New Agricultural Knowledge to farming tasks

If the knowledge in the agricultural curriculum is compatible with the farming tasks to be performed, the learners have high perceived value for it and a greater likelihood for applying it. The reverse is also true, (Crunkilton and Finch 1993, Marger and Beach Jr. 1967, Wharton 1971, William 1982).

Learner characteristics determine the amount of knowledge achieved by the

individual, the amount retained for use in farming, perceived value for the new knowledge, and almost all the other factors in the process of applying the new knowledge, (Bajah 1990). If the young farmer changes his goal for instance, use of new agricultural knowledge may be discarded (Johnson 1990).

The process of acquiring new knowledge determines the usefulness of the knowledge to the learner, its compatibility with tasks to be performed in farming (Eisemon 1991, Olaiton and Onazi 1989). Problem-solving approaches to teaching agriculture make knowledge acquired more useful to learners (Swanson and Claar 1984).

The societal value attached to the new agricultural knowledge is determined by several factors including the labour market demand for the use of the knowledge (Forster 1979), social recognition for farmers (Chitambar 1972), the levels of earnings derived from farming as well as the poverty level of farmers (Crunkilton and Finch 1993). This implies that the decision to enter into farming is determined by the value society places on those who are already farming. Young people are therefore likely to enter farming and be exposed to the chances of using new agricultural knowledge if the socio-economic conditions of farmers are attractive. They may prepare for more prestigious professions and ignore farming if farmers remain poor. At any rate, some may be compelled to farm as a substitute career or out of frustration.

Support programmes for young people in the form of ease in land acquisition, provision of irrigation facilities, credit, marketing programmes, education and information service facilitate use of new agricultural knowledge than those who have no support (Sanderson 1996).

Socio-cultural factors such as beliefs, superstition and taboos prevent use of new knowledge and information (Hilden 1997, Taylor 1996). Farmers who are not hindered by such factors tend to use more new knowledge than those who are superstitious.

Type of agricultural product being produced, land tenure, rainfall, drought and other physical factors constitute the agricultural production environment. Firstly, the kind of agricultural product to be produced determines the type of knowledge required to be used.

Land tenure, rainfall and drought can pose as risks or threats and serve as impediments to agricultural production (Johnson 1990). Provision of support schemes such as irrigation facilities, land policies regarding the youth and other programmes to reduce the effects of these constraints in farming can facilitate the use of new knowledge. Khandker (1996) noted higher returns to education for boys when irrigation facilities were provided in their villages in Bangladesh.

Cognitive dissonance determines the value learners attach to the new knowledge. When learners use new knowledge in home farming they experience lower level of cognitive dissonance and therefore develop greater value for the new knowledge.

Comparative advantage for use of new knowledge is a factor introduced by the study. It includes factors such as indigenous knowledge systems and other types of knowledge that are very well known and used by the farmers in the social system. It implies that if the use of new knowledge for performing a farming task is not advantageous to the farmer at a particular point in time, an existing alternative knowledge will be used.

2.12 New knowledge utilisation setting

The application of agricultural knowledge by a farmer can be observed and measured through the farming practices that s/he undertakes in the production process. Farming practices are products of the education enterprise; they are learnt and therefore the type of agricultural education one has determines the type of farming practices that one learns and enacts in the production process.

Education and Training provides new knowledge, attitudes and skills which in turn produce competence in learners and empower them to modernise or do things in new ways (Wharton 1971, Bown and Tomori 1979, Sanderson 1996). Since the Middle School leavers and JSS graduates have different types of agricultural education and training, they have different types and levels of knowledge, attitudes and skills. The quality of learning achieved may also be different. The quality of education one receives cannot be measured in terms of knowledge acquisition alone, usually manifested in possession of degrees, certificates and other credentials but also in knowledge and information use, concept formation, development and application of analytical skills (UNESCO 1994). The knowledge the two groups of learners have should be manifested in their farming practices if they perceive them valuable. But to use the new knowledge, certain factors in the person and conditions surrounding the farm business control the process. Some of these factors are discussed as follows.

2.12.1 Aims in farming

The aims for farming by small-scale farmers have been outlined by Dupriez and De Leener (1988) and Wayne et al (1989) as Family Food, Cash Income, Secured Community living, Protection of the Farm Environment and Leisure. Wayne and

others classified farmers into two main categories on the basis of their aims in farming namely; the pursuit of utility and profit. Farmers whose priority aims are food, secured community living, leisure and protection of the farm environment fall under the category that seeks utility or satisfaction; those who pursue cash income belong to the profit seeking group. It was indicated that the pursuit of profit or utility divides farmers into two sub-groups namely; commercial and peasant farmers and consequently their farming practices (Johnson 1990). Commercial farmers tend to apply capital intensive methods while those who pursue utility tend to apply labour intensive methods in their farming operations.

2.12.2 Farm ownership and business structure

The farming practices that are applied by a farmer can be understood from several factors including the type of product being produced, type of technology of production available, the education and training had, and the type of ownership of the farm business.

The type of ownership determines the business structure or organisational frame within which the farmer operates (Johnson 1990). Organisational structure divides the organisation into component parts and specifies roles these will play in achieving specific aims of the organisation as a whole (Derek, Aysen and Edwards 1998).

The types of business structures or farm ownership systems discussed by Johnson (1990) included Sole Ownership, Partnership, Company Farms, State Farms, Collective farms and Public Corporations. In all, the type of farm ownership system determines the business structure within which a farmer operates. It also determine

aims for farming, type, source and size of credit, ease of getting land and production decision- making, (Johnson 1990).

2.12.3 Achievements from farming

The indicators of achieved value for use of new knowledge in farming are the outputs of the farming process. The outputs of a farming programme include size and quality of farm products, food security, cash income, profit, properties acquired, utility or satisfaction derived from farming and security in life (Chaplin and Krawiec 1974; Dupriez and De Leener 1988; McCreary 1989; Wayne et al 1989). The size of the achieved value for the utilisation of new knowledge determines the extent of continued or discontinued use of the knowledge.

2.13 Conclusion

The literature on the process of utilising new agricultural knowledge for farming indicates that a plethora of factors affect it. These intervening factors enhance or impede the application of new agricultural knowledge and consequently determine the outputs or benefits of using new knowledge. The main intervening factor from the educational sector is the compatibility of the new agricultural knowledge to the farming tasks the graduates will face in their farming activities. If the new agricultural knowledge matches with the tasks, the school leavers will have more confidence to use the knowledge. However, if there is a mis-match between the new knowledge and farming tasks the graduates are likely to use less of the new knowledge.

Another factor which adds to the mis-match of new knowledge and farming tasks is cognitive dissonance. This occurs if there are conflicts between new knowledge and the knowledge being applied by learners while learning. Cognitive dissonance makes

learners fail to internalise knowledge acquired at school through the practice of the same at home.

The other intervening factors in the use of new knowledge lie outside educational intervention. But their effects on the process of applying new agricultural knowledge can be reduced if development programmes are designed to cater for them. In all, the most important factors in the process of using new agricultural knowledge is the individual human being, the value placed on the knowledge, ownership of the farming enterprise, the socio-economic status of farmers in the social system and support programmes put in place to encourage the youth to use new agricultural knowledge for farming.

CHAPTER 3

METHODOLOGY

3.0 Introduction

The study was conducted in the North Tongu District of the Volta Region, from 26th of May to 10th July, 1998. The period of the survey was to ensure that Junior Secondary School Teachers were in school to be reached and the actual farmers were met on the ground to forestall problems due to seasonal migration of farmers from the area particularly in the dry season.

3.1 Research design

The survey method was used to gather both quantitative and qualitative information from the respondents. Six categories of subjects were used for the study: Middle School leavers who stopped formal schooling between 1985 to 1990, Junior Secondary School graduates who did not continue schooling from 1990 to 1997 and were farming in the North Tongu District, the District Director of Agriculture, Agricultural Extension Agents, Junior Secondary School Agriculture Teachers and the District Co-ordinator of Agricultural Education.

3.2 Data gathering instruments and data collected

The data gathering instruments used for the study include a structured personal interview schedule, questionnaires, observation and unstructured interviews. The structured personal interview schedule was used for collecting information from the young farmers in order to obtain responses which can be analysed quantitatively. Unstructured interviews and observation were used to clarify issues concerning some of the responses given by the young farmer respondents.

3.2.1 Personal interview schedule

The information gathered from the farmers include demographic characteristics of farmers, background information on home training in farming, use of school agricultural knowledge in home farming, retained agricultural knowledge of farmer, factors influencing choice of farming as a career, aim in farming, farm ownership status, land ownership status and levels of farm investment in improved inputs;

Utilisation of new knowledge in: general farming practices (farm enterprise planning, record keeping and use of other sources of agricultural production information); crop production practices (choice of crops, land or soil testing, farm tool usage, planting methods, post-harvest treatment, and ranking of yield optimisation practices). Other types of data collected included new knowledge utilisation in animal production practices, achievements from farming, farmers' level of security in life and farmers' needs to improve on their performance.

3.2.2 Questionnaires

Questionnaires were used for collecting information from the District Director of Agriculture, Agricultural Extension Agents, Junior Secondary School Agricultural Teachers and the District Co-ordinator of Agricultural Education. The questionnaire for the District Director of Agriculture sought information on demographic data, agricultural production potentials of the district and programmes for young farmers. The questionnaire for the Agricultural Extension Agents collected information on social characteristics of the agents, new agricultural technologies introduced into the district after 1987, extension programmes for the youth, crop yield standards for extension operational areas and an inventory of on-farm agricultural occupations.

The questionnaires for the JSS agriculture Teachers and the Co-ordinator of Agricultural Education were virtually the same and sought information on demographic characteristics, agricultural education human and material resources, school-based crop yield standards, approaches to the teaching and learning of practical work in agriculture, activities between agricultural education and agricultural research and follow-up activities on Junior Secondary School graduates farming in the district.

3.2.3 Validation of instruments

The instruments for the study were examined by my colleagues and supervisor. They were further trial tested in April 1998 in the Ho District which shares a common boundary with the North Tongu District. After trial testing the instruments were revised for the final data collection.

3.3 Study population

The population of subjects of the study consisted of Middle School leavers who completed schooling between 1985 to 1990 and Junior Secondary School graduates who terminated School between 1990-1997 and were farming. The total population of the young farmers was not known. The total stratified population of other respondent categories in the study was made up of 23 Extension Agents, 61 JSS Agricultural Science Teachers, one Director of Agriculture and one Agricultural Education Co-ordinator.

3.3.1 Sample size

The total sample size was 140 subjects made up of 120 young farmers 10 Agricultural Extension Agents, 8 Agriculture Teachers one District Director of Agriculture and one District Agricultural Education Co-ordinator. The 120 young farmers consisted of 60

middle school leavers and 60 JSS graduates. The sample size was considered large enough for analytical purposes. The Middle School sample was made up of 48 men and 12 women while that of the JSS consisted of 39 men and 21 women. In all, 10, 25, 35 and 50 farmers were interviewed from Aveyime, Juapong, Adidome and Mafi-Kumase agricultural sub-districts respectively.

3.3.2 Sampling method

There was no sampling frame for the young farmers to enable the use of probability sampling approach. In such cases the Snowball method is a reliable non-probability method to sample individuals (Robson 1993, Sarantakos 1993). Snowball sampling involves first identifying and interviewing an individual from the study population. After interviewing the first respondent he or she is used as an informant to identify another member of the study population. The snowball process continues until the appropriate sample size is achieved.

The researcher used the snowball sampling technique for selecting villages visited in the four agricultural sub-districts where young farmers were found with the assistance of Agricultural Extension Agents, Circuit Supervisors and Teachers. He contacted the farmers that could be reached who in turn showed other villages where more farmers could be reached. The snowball process was used in the four zones in the district until the sample size of 120 farmers was achieved.

To avoid influences from the Agricultural Extension Agents on the farmers, the researcher reached the villages by bicycle or a motorbike operated by one of his friends who was not associated with the farmers.

With the stratified lists of Agricultural Science Teachers and Extension Agents, simple random sampling was used to select them for administration of the questionnaires.

3.4 Contact with young farmers

In every village visited, first contact was made with a teacher in a Junior Secondary School or Headman or Chief of the village. Assembly men were avoided because of fears that they might politicise the study. The contact person identified in a town or village was asked to identify other young farmers in the category being studied by calling one of them who in turn called others available. A list of young farmers in that village was made. Appointment was made with the young people for the day and time of the interview. They were asked to inform their friends about the meeting. The days of meeting in most of the villages were taboo days or Sunday afternoons since these were the periods they were free to be interviewed. In some villages however, young farmers were interviewed just after preparing their list if they were physically available and willing to participate.

In every village visited, at most 10 percent of the Middle School and JSS leavers listed as farmers were purposively selected and interviewed taking into consideration their sex, type of school attended and the type of agricultural products they produced. This was meant to prevent biases due to gender and product disparity to ensure a greater coverage of young farmers' characteristics in the district in respect to types of agricultural products they learnt in school and produced.

3.4.1 Conduct of the interview.

The purpose of the study was explained to the farmers and major products produced by them were identified through open-ended questions. This was to aid

the researcher in selecting farmers producing products that were not covered sufficiently in other villages. Again, through open-ended questions group needs of the farmers were identified and prioritised by them. This was to provide a framework of needs to guide the researcher in identifying priority needs of individual farmers.

The interview process involved the researcher giving a copy of the interview schedule to a respondent to read. After reading, the researcher collected the copy of the interview schedule and asked the respondent questions on the schedule. The answers provided by the respondent was recorded by the researcher. The interview process itself was facilitated by the positive attitudes of all the respondents interviewed. A minimum of two interviewees were in attendance for the interviews. Individual interviews lasted for 50-70 minutes. The number of interviews conducted a day varied from 1 to 6.

At the end of the day, the researcher kept a cumulative record of the number of interviews conducted in a day indicating type of school attended, sex of interviewee and type of farmer. This was used as a guide in selecting farmers for subsequent interviews to get a balance between subjects interviewed on the bases of gender and type of agricultural products produced.

It was noted that middle school leavers who were women and terminated schooling in the period being studied were difficult to get in the villages visited. The researcher visited farms of some of the respondents to cross check some of the practices they reported in the interviews for instance, row planting and record keeping.

3.4.2 Administration of Questionnaires

The names of the Agricultural Extension Agents were obtained from the District Agricultural Office together with the zones in which they worked. This made it easy to locate them in the villages where they lived. The purpose of the study was explained to them and the questionnaire was give to them to fill. The filled questionnaire was collected a day later.

The JSS Agricultural Science Teachers were visited at their schools and questionnaires were given to them to fill. The questionnaire were collected after filling it on the same day.

3.5 Data Analysis

Data collected was coded and analysed using the Statistical Package for the Social Scientist (SPSS). The statistics used included frequencies, percentages, The Wilcoxon-Mann-Witney Test, Rank scores and the Kendall Coefficient of Concordance.

3.5.1 Measurement of Performance

The key parameters of performance in farming assessed in the study include percentage levels of retained new knowledge, frequency of use of school-based agricultural knowledge in home farming while at school, new agricultural knowledge utilisation in out-of-school farming, mean ranking of causes or reasons for participating or not participating in a farming activity, levels of agreement in ranking factors or reasons associated with the performance of farming activities, tangible achievements in farming and levels of security in life.

The performance of the young farmers was assessed at five main stages. First, the level of utilization of new agricultural knowledge in home farming while at school was determined. Second, the retained knowledge level of the respondents was measured through a multiple response test. Thirdly, the use of new knowledge in out-of-school farming was assessed in three stages; namely general farming practices, crop production practices and animal production practices. In each case, the number of each respondent category that participated in a farming practice was determined. Fourthly, since a set of respective farming tasks constitute a corresponding farming practice, the percentage sub-mean total level of utilizing new agricultural knowledge measured by the farming tasks formed the level of participation in a farming practice to which the tasks belong.

Fifthly, to identify causes of some of the observations and solicit reasons for participating or not participating in some farming tasks, the farmer respondents were asked to rank factors associated with some of the farming tasks or practices. The mean rank score was used to compare the performance of the farmer respondents. The highest mean score for any of the factors or reasons that were rank ordered, the greater the importance accorded that factor or reason by the respondents as well as its significance in data interpretation.

3.5.2 Measurement of retained knowledge levels

Based on the methods of measuring retained learning, the study used recognition for test item number one (fertilizer label) and item number two (pesticide test item). Reconstruction knowledge measuring method is used for test item number three (sheep breeding), item four (farm output estimation) and item five (determination of net farm margin). The percentage level of retained knowledge was measured

through a multiple response test. The test items consisted of three response options. For each test item, one of the response options was correct while two were wrong. In scoring, the number of each respondent category which picked correct options of the test items were computed in percentages.

3.5.3 Measurement of new knowledge utilisation in farming

The utilisation of new agricultural knowledge by a person can be observed in the type of farming tasks the one performs and the processes of carrying out the task. A set of tasks constitute a farming activity. Level of knowledge utilisation in a farming activity was determined in percentages by computing the number of farmer respondents who took part in an activity being measured. After determining the level of participation of the respondents in a set of farming tasks, the sub-mean total of participation in a farming activity was determined by adding all the percentage scores for the respective tasks and dividing it by the number of tasks constituting the farming activity.

To identify a high knowledge user respondent category from a low user, the percentage task totals and sub-mean totals of participation in a farming task or activity of the respondent categories were compared. The higher the percentage a respondent category indicates in participating in a farming task or activity, the higher the level of new knowledge utilisation of the group in that farming activity. The percentage scores of the respondents in every farming task and activity considered by the study were compared and commented on .

3.5.4 Final levels of knowledge utilisation in farming

To determine the final levels of new agricultural knowledge utilisation of the Middle School and Junior Secondary School leavers in farming, one measurement was made in the study, namely; grand mean total knowledge utilisation in farming which is the mean of the mean total knowledge utilisation in general farming practices, crop production practices and animal production practices.

3.5.5 Differences in knowledge utilisation and achievements from farming

The Wilcoxon-Mann-Whitney Test statistic was used to determine differences between the respondents in levels of retained agricultural knowledge, out-of-school new agricultural knowledge utilization in farming and achievements from farming. The Wilcoxon-Mann-Whitney Test is a statistic used for measuring differences between two independent groups when categorical or ordinal data samples are collected from the two groups, (Siegel and Castellan, 1988). For instance, if we have data from two independent populations **X** and **Y**. The null hypothesis (H_O) is that **X** and **Y** have the same distribution. Thus, Ho: P [X>Y] =1/2. The alternative hypothesis is that a score from **X** is larger than a score from **Y**; H_1: P[X>Y] < 1/2. This implies that the "bulk " of the elements of population **X** are larger than the bulk of elements of population **Y**.

In predicting differences between two independent populations when the direction of the differences are not stated, the alternative hypothesis is; H_1: P[X>Y] ≠ 1/2.

The procedure in calculating the Wilcoxon-Mann-Whitney Test is as follows:

- Let **n** represent the number of cases in the sample from **X** and **m** the number of cases in the sample from **Y**. The observations or cases from both groups are

ranked in order of increasing size being careful to retain each score's identity as either an X or Y score.

- Calculate the sum of the ranks for each of the groups, i.e. W_x and W_Y.
- Determine the sum of ranks for the combined group, i.e. $W_x + W_Y = \underline{N(N+1)}\ /2$, where N= **n+m** (the sum of the cases of X and Y).
- If the null hypothesis is true, the average ranks in each of the two groups would be about equal.
- When tied scores occur, each of the tied observations are given the average of the ranks they would have had if no ties had occurred. A correction for ties should be used if two or more ties occur involving both groups. The values do not change much if ties occur in the same group.
- When the number of cases in X and Y are small, i.e. ($\mathbf{n} \leq 10 \geq \mathbf{m}$) probability tables are used to test for significance.

3.5.6 Testing for significance of Wilcoxon-Mann-Whitney Test

The method for testing for the significance of W_X depends upon the size of **m** and **n**, the number of cases from each group. If $\mathbf{n} \leq 10 \geq \mathbf{m}$, the exact probability associated with a value as large or as small as an observed W_X is given in Appendix Table J which are one-tailed probabilities. In this study Appendix Table J sufficed for all determinations of W_X.

3.5.7 Rankings

The young farmer respondents were asked to rank factors embodying the causes or reasons for performing or not performing certain farming activities. The ranking was designed to elicit the reasons behind the performance of various farming activities,

or identify the causes of behaviour observed in the respondents. The factors ranked by the farmer respondents included factor influencing choice of farming, aims for farming, crop yield optimisation practices and the priority needs of the young farmers.

3.5.8 Ranking of needs

Most of the farmer respondents identified six and seven needs. But those who identified eight needs were in the minority. To complete the ranking of the eight needs, the average rank score of 7.5 was given to the seventh and eight needs for those farmers who listed and prioritised only six needs.

3.5.9 Levels of agreement or disagreement between respondents

The Kendall Coefficient of Concordance, **W**, is a statistic which measures the level of agreement between more than two individuals or groups in ranking a set of factors greater than two, (Sigel and Castellan Jr. 1988). To determine the mean rank scores and the Kendall Coefficient of Concordance, **W**, the order of ranking as done by the farmer respondents were calculated by reversing the ranks given by the respondents. In the calculations the highest rank scores were allotted to the most important factors and the lowest rank scores to the least important factors. This was to enable the highest and lowest ranked factors to be projected accordingly. The results of the mean rankings of the factors or reasons were determined and presented in tables or bar charts.

The following were ranked: factor influencing choice of farming, aims in farming, yield maximisation practices and the felt-needs of the farmers. The mean rank scores which show the level of importance attached to a factor among a group of ranked factors was used to compare the performance of the farmer respondents.

The greater the rank score for a particular factor, the higher the level of importance attached to it by the respondent category.

The Kendall Coefficient of Concordance, **W**, was calculated for all the ranked data using the formulae suggested by Siegel and Castellan Jr. (1988) for non-tied and tied observations respectively.

For non-tied observations the Kendall Coefficient of Concordance , **W**, is given by the relationship : $W = \frac{\sum(R_i - R)^2}{N(N^2-1)/12}$,

where **N** = number of factors being ranked,

R_i = average of the ranks assigned to i^{th} factor,

R = the average (or grand mean) of the ranks assigned across all factors and $N(N^2-1)/12$ = maximum sum of squared deviations.

3.5.10 Test of significance of the Kendall Coefficient of Concordance, W.

The Kendall Coefficient of Concordance measures the level of agreement or disagreement between respondent categories on factors they ranked (Siegel and Castellan Jr., 1988). To test for the significance of **W,** the calculated value of **W** is compared to the values in the appropriate tables. The Null Hypothesis is true, that is, the ranking is random and does not have any relationship if the calculated value of **W** is equal or less than the value in the table at **p=.05** and **.01** and **N-1** degrees of freedom. The Null Hypothesis is rejected, that is, the ranking is not at random and a relationship exists between the respondent categories indicating a level of agreement among them if the calculated value of **W** is greater than the value in the table at the appropriate probability level and degrees of freedom.

In this study, the number of factors ranked in each case, **N**, ranged between 4 to 8, ($N \leq 8$), and the set of rankings, k, ranged between 12 to 120, ($12 \leq \mathbf{k} \leq 120$). When $K \leq 20$, the significance of **W** was directly referred from Table T which gives critical values of **W** at probability, **p =.05** or = **01** significant levels and (**N-1**) degrees of freedom.

In cases where the number of sets of rankings is more than 20, ($\mathbf{k} \geq 20$), the chi-square values, χ^2, which is related to the Kendall Coefficient of Concordance by the equation $\chi^2 = \mathbf{k\ (N-1)W}$, suggested by Siegel and Castellan Jr.(1988) is used to determine the levels of agreement or disagreement between the respondent categories on their ranking of the factors.

3.5.11 Achievements from farming

The fourth type of measurement made by the study was that of achievements in farming. The achievements of the farmer respondents from farming were measured in percentages at two main levels. First, tangible achievements which included indicators of successful farming and security in life. Security in life was measured on a 5-point rating scale namely; very insecure, not secure, uncertain security, secure and very secure. The measurement was made by computing the number of members of the various respondent categories who indicated having attained any of the objectives in farming. The achievements presented to the farmer respondents included success in farming, high farm outputs (yield), food security, cash income, acquisition of properties and security in life.

3.6 Report Frame

Chapter one of the report deals with the research problem, research questions, objectives of the study, significance of the study, definition of terms and scope of the problem. In chapter two, the theoretical framework of the study in the form of a scheme for utilizing Basic School Agricultural Knowledge has been outlined with the intervening factors in the process of utilizing new knowledge. Chapter three discusses the method of the study while chapter four concentrates on the study area. Results and discussion are presented in chapter five, six, seven and eight.

While chapter five deals with the profiles of the Agricultural Education systems in the district and the social characteristics of the respondents, chapter six assesses and compares the retained agricultural knowledge levels of the farmer respondents. The factors which influenced the young persons to enter into farming and their aims in farming form the focus of chapter seven.

The process of knowledge utilisation and its effects on the respondents, achievements of the young farmers and assessment of constrains which impede their progress in farming are dealt with in chapter eight. Finally, chapter nine of the report dwells on summary, recommendations and conclusion.

The report presentation approach used for the study is as follows: first, the results of the responses of the farmer respondents to questions on an issue are presented in tables or figures, then followed by a discussion of the information deduced from the tables or figures. That procedure is observed throughout the report. The approach is adopted to facilitate the process of referring to tables and figures in reading the report.

CHAPTER 4

SYNOPSIS OF BASIC EDUCATION AND AGRICULTURAL PRODUCTION SYSTEMS IN NORTH TONGU DISTRICT

4.0 Introduction

This part of the study deals with the background information about North Tongu District. It covers the physical features, the educational system and the agricultural production system of the district. The information about the district is important because it provides the framework within which the young farmers were educated and trained in agriculture. It also provides the socio-economic agricultural production setting within which the young persons farm. The conditions in the district influence the activities and operations of the young farmers.

4.1 Geographical location

North Tongu District lies within latitude 5^0 47' N to 6^0 N and longitude 0^0 5' E to 0^0 45' E. It shares common boundaries with Akatsi, Ho and Sogakope Districts in the Volta Region, Asuogyaman in the Eastern Region, Dangme-West and Dangme East in the Greater Accra Region. The District is divided into two unequal halves by the Volta River, stretching from the lower Volta gorge near Akosombo in the north to Awadiwoe Island, located north of the Lower Volta Bridge at Sogakope. The total area of the District is 1460 km^2. A map of North Tongu District showing the road network, towns and villages from which the respondents were drawn for the study is shown in Figure 4.1.

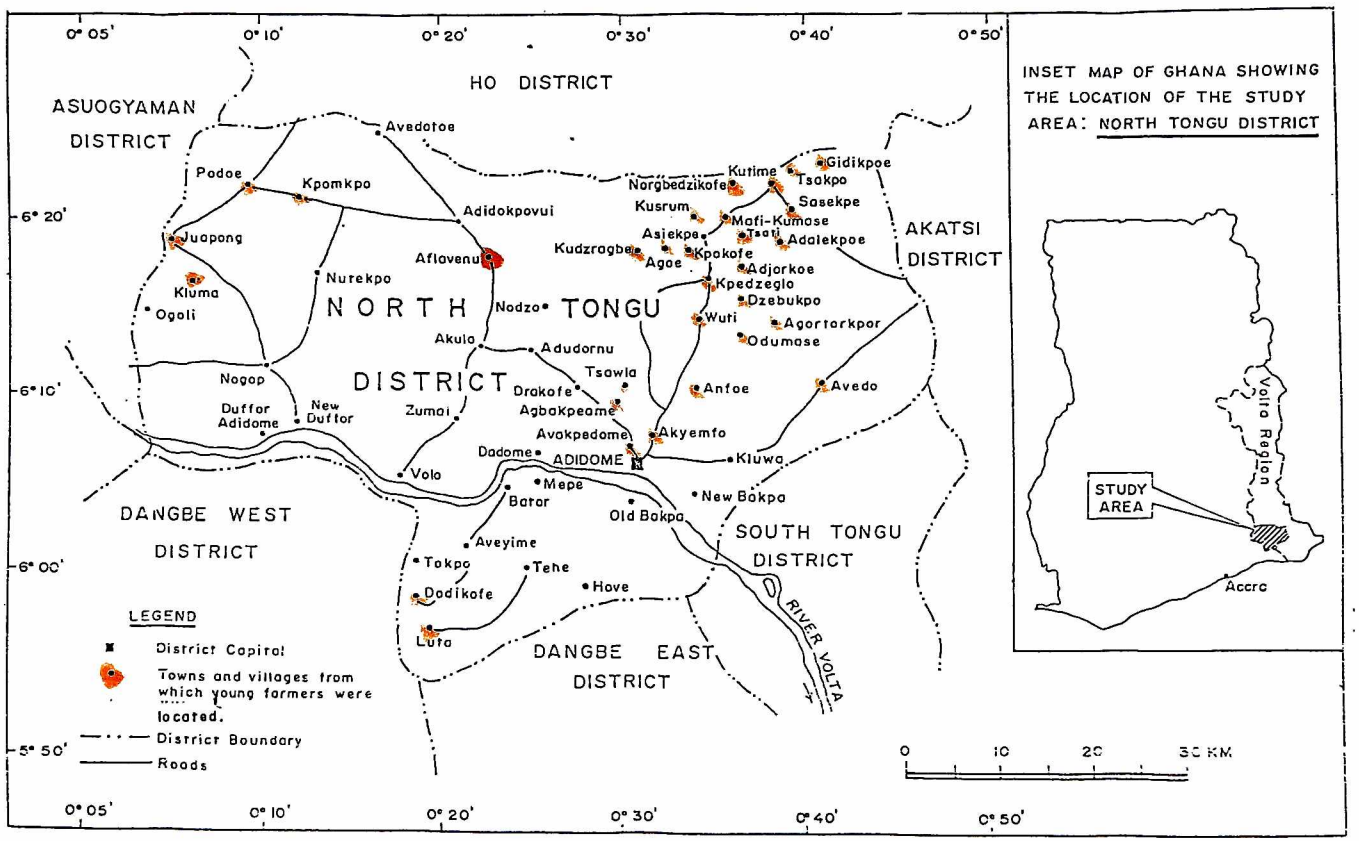


Figure 4.1: A map of North Tongu (Adidome) District showing the road network, towns and villages from which the respondents were drawn for the study.

4.2 Topography

The topography of the district is gentle, rising from near sea level to a height of about 18 metres (60 feet) above sea level, with slopes less than 5 per cent. The areas near the Volta River are at a higher elevation, falling gradually backwards and rising again into the Adaklu Hills. This has created large catchment areas that span the Alabo, Kolo and Aklakpa streams and other tributaries, causing extensive flooding making the area difficult to traverse. The topography is gentle with a few iselbergs which rise abruptly from the plains, namely Avakpe hills, Asiekpe Hills, Nukportoe, Akpokpo and the Kluma Hills which are composed of granitic rocks. The Todze Hills located near New Bakpa are composed mainly of marble.

4.3 Climate

The district enjoys a Tropical climate, greatly influenced by the South-West Monsoons from the South Atlantic and the dry harmattan winds from the Sahara. There are two rainy seasons, the major one from mid-April to early July and the minor from September to November. Over 50 per cent of the total rainfall occurs in the major season. The average annual rainfall varies from 900mm to 1100mm. However, there are considerable variations in the time of onset, duration and intensity of the seasonal rainfall.

Temperature and relative humidity vary very little throughout the year. The mean temperature is 27 ^{0}C and the maximum and minimum vary from 22 ^{0}C to 33 ^{0}C respectively. March and April are the hottest months whereas July and August are the coolest months. Average relative humidity is about 80%.

4.4 Soils

The main rock composition of the terrain consists of acidic and basic gneiss and schists. There are dominantly medium to moderately coarse textured alluvial soils along the Volta River. Below these are the heavier clay soils (Akuse series) that characterize most parts of the District leading to poor surface and sub-surface drainage, making road development difficult. These soils are also very difficult to cultivate because they have low water holding capacity. However they are suitable for rice and sugarcane cultivation under irrigation.

In the locations of Adidome, Anfoe, Kpedzegblo, Mafi-Kumase, Sasekpe and Bakpa Avedo the soils consist of moderately coarse or sandy loams which drain easily and are suitable for agricultural purposes. These soils however, have low water holding and cation exchange capacity.

4.5 Vegetation

The North Tongu District lies within the tropical savannah grassland zone. The vegetation is generally, low savannah characteristic of the Accra and Ho-Keta plains. Dense vegetation is seen along the Volta River and other river basins due to the presence of subsoil moisture. The vegetation close to river basins consists of trees such as mangoes, oil palm, baobab, silk cotton, acacia and other trees. Further from the river basins, the vegetation is sparse, predominantly grassland, interspersed with neem trees, Guinea grass, Spear grass and other grasses. An important feature of the vegetation in these areas is Borasus Palm which dots Mafi-Kumase, Agohome and Avetakpo areas. The Borasus Palm provide special wood used extensively as timber for housing and fencing purposes in the district. The leaf petioles of the Borasus Palm serves as source of firewood in gari processing in the Mafi-Kumase area. Fuel-wood

and charcoal extraction, though providing sources of revenue have completely destroyed the tree-cover with consequent ecological problems. The main affected areas being Alabo, Mafi-Kumase, Volo, Duffor, Aklakpa and Dedukope. Stumps of neem and other felled trees pose problems during land clearing operations such as ploughing and harrowing. The shrub and grassland areas provide suitable grounds for cattle grazing which make the district one of the largest cattle producing areas in Southern Ghana. Uncontrolled grazing and frequent bush fires are gradually reducing such areas into near desert conditions.

4.6 Drainage in the district

River Todze and its western tributaries drain the eastern part of the district into the Avu lagoon. In the rainy season, these streams overflow their banks causing damage to roads and farms. Numerous creeks including Ke, Aklamadaw, Amidoe, Akplordo exist in the district. Several water harvesting structures such as ponds, dugouts or dams are found in the district. Major ones are located at Atiteti, Adudonu, Mafi-Kumase and Adidokpavu. These serve as sources of water supply for the inhabitants and livestock. Most of these water sources dry up in the dry season and pose problems of scarcity of portable water for humans and domestic animals in the district.

4.7 Social groups

The North Tongu or Adidome District is inhabited by eight social groups namely: Bakpa, Battor,Duffor, Fodzoku, Mafi, Mepe, Torgorme and Volo. Duffor, Fodzoku and Torgome are often referred to as Dusor (Psalm Consults, 1996). These Traditional Areas have some social groups such as Battor Development Association, Mafi Development Association (MADAS), Mafi-Kumase Area Youth Association (MAKAYA), Mafi-Kumase Women Development Association (MAWODA), Mepe

Development Association, Bakpa Youth and Development Association and Volo Development Association. The main concern of these social groups is the development of their respective traditional areas. These groups plan their annual festivals, raise funds for development projects, execute development projects and collaborate with the District Assembly.

There are a number of non-governmental organizations (NGOs) which operate in the District. They play important roles especially in the provision of social services and infrastructure facilities to the rural communities. However, none of them have agricultural objectives as such. Some of the NGOS include Danida, Volo-Esbjerg, Mafi-Kumase-Elgg, Caretas-MAWODA.

4.8 Population of North Tongu District

The population of the District rose from 55,000 in 1970 to 90,000 people in 1984 (Psalm Consults, 1996). Current estimates suggest a range from 115,600 persons to 126,400 by the year 2000. It is estimated that 48 percent of the population are in the active age group (15-59 years) an indication of a high dependency.

4.8.1 Population distribution

The physical factors appear to dictate the spatial distribution of the population in the district. With the exception of Duffor and Mafi-Kumase areas, a greater proportion of the population is found along the Volta River as observed by the distribution pattern. However, isolated settlements dot the whole of the physical landscape. Population density generally is very low a factor for agricultural expansion since land may be available but not necessarily accessible to investment. The population settlement

pattern is highly skewed towards rural settlement (about 94% as against 6% urban population) (Psalm Consults, 1996).

4.9 The Education System

The Basic Education system consists of Kindergarten Schools, Primary Schools and Junior Secondary Schools. The three complements of the basic education system are available in the North Tongu District.

4.9.1 School facilities

The total number of basic schools available in the district in 1996, their condition and number of pupils as described by Psalm Consults are shown in Tables 4.1 and 4.2.

Table 4.1: Number of Basic Schools and the nature of classrooms in North Tongu District.

Type of school	No. of schools	No. of classrooms	No. of decent classrooms	No. of bad classrooms
Kindergartens	35	98	14	84
Primary Schools	120	484	149	335
Junior Secondary Schools	64	210	90	120

Source: Psalm Consults (1996, page 41).

Psalm Consults indicated that it was not difficult to obtain admission for children of school going age in the North Tongu District. The number of pupils in Basic and Senior Secondary Schools is shown in Table 4.2.

Table 4.2: Number of Pupils in Schools in the District.

TYPE OF SCHOOL	BOYS.	GIRLS	TOTAL
Pre-School (Kindergarten)	988	1174	2162
Primary School	8604	8107	16711
Junior Secondary School	3411	2328	5739
Senior Secondary School	1181	454	1635
TOTAL	14184	12063	26247

Source: Psalm Consults (1996, page 43).

4.9.2 Staffing in Schools

The staffing situation in schools in the District as indicated by Psalm Consults is shown in Table 4.3.

Table 4.3: Number and Type of staff in schools

TYPE OF SCHOOL	TRAINED		UNTRAINED		TOTAL
	M	F	M	F	
Pre-School (Kindergarten)	6	37	8	99	150
Primary School	326	132	106	10	574
Junior Secondary School	207	33	100	4	344
Senior Secondary School	38	10	41	9	98
TOTAL	577	212	255	122	1166

Source: Psalm Consults, (1996, page 43)

The schools are staffed with a considerable number of untrained teachers as indicated in Table 4.3. This together with poor condition of facilities contribute largely to poor performance of pupils and students.

The staff level at the District Education Service Office was under an Acting Director who was an Assistant Director. There were other assistant Directors, Principal Superintendents and Senior Superintendents with rather low academic qualifications, a source of worry and an unsatisfactory condition for effective administration and management of the education system in the district at the time of the study.

4.9.3 District Junior Secondary Schools

At the time of the study in 1998, there were 70 Junior Secondary Schools in the North Tongu District, an increase of four schools compared to the situation in 1996 as reported by Psalm Consults. The schools were distributed in nine educational circuits as follows: Adidome (10), Aveyime (8), Avedo-Bakpa (6), Duffor Adidome (5), Juapong (7), Mafi-Kumase (13), Mepe-Dove (11),Podoe (4) and Zongo/Kpedzegblo (6).

4.9.4 Problems in the formal Education system

The major problems in the formal educational sector as summarized by Psalm Consults (1996) include:

- poor performance of pupils;
- high female dropout rate after primary level.
- poor classroom and furniture condition in the schools;
- inadequate teaching / learning materials (textbooks, supplementary reading materials) and sports equipment;
- inadequate qualified teachers, circuit supervisors and support staff in the schools;
- inaccessibility of many schools owing to lack of roads in many parts of the District and the riverine nature of the landscape which create flooding and waterlogging;
- lack of accommodation for staff especially in the remote areas;

- low community involvement and participation in infrastructural development and management of schools; and
- lack of adequate planning and management information.

4.10 The Non-Formal Education System

Besides the Basic Education system, the Ministry of Education also provides non-formal education mainly to adults through the Non-Formal Education Division. The main objectives of the functional literacy programme in the district are to make illiterate adults functionally literate, provide civic education to both literate and illiterates and training people in income generating activities such as farming, soap making, pottery, weaving and others. It was reported by Psalm Consults (1996) that by '1993 a total of 3014 learners made up of 2443 females and 571 males were functionally educated'.

4.10.1 Problems in the Non-Formal Education system

The main problems confronting the Non-Formal Education system in the District as stated by Psalm Consults (1996) are: inadequate funding, lack of instructional materials such as primers, writing materials; lack of logistics, stationery, lighting units, equipment; lack of means of transport; inadequate staff and lack of appropriate office accommodation. With the exception of Torgome Library, no other public library facility is located in the whole district.

4.11 Agricultural Extension Service

The agricultural extension system in the district at the time of the study is the Unified Agricultural Extension Service (UAES) with a staff of 25 officers made up one Director of Agriculture, a Deputy Director and 23 Agricultural Extension Agents (AEAs). The Unified Agricultural Extension Service was just about to start operating in the District at the

time of the study in 1998. North Tongu District is divided into four agricultural sub-districts namely: Adidome, Aveyime, Juapong and Mafi-Kumase. The distribution of Agricultural Extension Agents per sub-district is five, four, seven and seven respectively.

4.12 Other Agricultural Training Institutions

Apart from the formal education system, non-formal education, and agricultural extension service which give training and education to young people in the North Tongu District, there is also the Adidome Farm Institute which is among three others nationally. The organisation and administration of Farm Institutes is under the Ministry of Food and Agriculture (MOFA). The Farm Institute curriculum provides knowledge and skills in Vegetable Production, Field Crop Production, Poultry and Livestock production, Farm Management, Farm machinery, Farm Workshop Practice, Soil Science, Surveying and English Language.

The main problems besetting the Institute include inadequate funding, insufficient training resources and time, inadequate research support and low enrolment. It is observed that the graduates of the farm institutes prefer public sector employment instead of the private sector.

4.13 The Agricultural Production System

The economy of the district is based mainly on agricultural production which involves small-scale farmers with small and scattered holdings. With the exception of the farm tractor, the farmers use traditional tools with little mechanisation due to lack of capital for investment and the capacity to use high technology for production. As low resource farmers, many young people organise themselves into co-operative labour gangs to facilitate farm-work in the district.

A five-day working week controls farm work and rest or taboo days in the typical traditional religion dominates in the district. However, the areas occupied by christians use the seven-day week calendar and rest on Sundays. In the Dedukope area Monday is the taboo day. There is shortage of labour in the peak of the farming seasons since almost every able-bodied person operates a farm. Migrant labour from other districts such as Akatsi and other places who use to assist farmers in the district have not been coming of late.

Although the Agricultural sector is the major economic activity area, it is characterized by low productivity and high level of post harvest losses particularly in maize and vegetables. No modern agro-processing facility exists in the district except Juapong Textiles Limited. Agro-processing activities in the district involve traditional technologies mainly practised by females.

4.14 Crop Production

The main crops produced in the district and the locations of cultivation are shown in Table 4.4. Crop production is rain-fed except at Aveyime where rice is produced under irrigation.

Table 4.4: Major crop production areas in North Tongu District.

CROP	MAJOR PRODUCING AREAS
Maize	Bakpa-Avedo, Mafi-Kumase, Juapong
Cassava	Bakpa-Avedo, Mafi-Kumase, Juapong, Podoe, Duffor
Groundnuts	Mafi-Kumase, Fakpoe Boklotovui
Cowpea	Mafi-Kumase, Adidome, Duffor, Volo
Sugar Cane	Boklotovui, Fakpoe
Vegetables	Atiteti, Adidome, Dedukope, Adakpe, Ahumakope
Oil Palm	Fodzoku, Juapong, Sasekpe, Bakpa Avadiwoe
Rice	Aveyime
Mangoes	Battor, Mepe, Devime

Source: Adapted from Psalm Consults (1996, p.25).

4.15 Irrigated farming

Pilot project for rice production has been in existence near Aveyime since 1965 with water pumped from the River Volta. During the period of the study, the farmers complained of high water rates which have made the irrigated rice production non competitive hence no Junior Secondary or Middle School leavers of the year-groups being studied were found on the Aveyime Rice Project. In addition, several other small plots are farmed for rice by local farmers that receive run-offs from the surrounding areas. Vegetables are also grown at Adape and Ahumakope by irrigation.

The Dove Agriplex (Quality Seed) Project located on the right bank of the Volta River between Dove and Aveyime started at the time of the study.

4.16 Fishing

Fresh water fishing in the Volta River, an important occupation in the district has declined considerably due to the formation of the Volta Lake. The principal traditional fishing communities notably, Bakpa, Battor, Mafi, Mepe, and Volo which are close to the Volta have had their economic bases eroded. Many of the economically active population have migrated to other fishing locations along the Volta Lake in the Atebubu, Afram Plains, Gonja-East, Kete-krachi, Nkwanta, Kpando and other districts.

The traditional clam industry which was an important economic activity for women from Ada up to 60km upstream has equally vanished as the river's flow reduced considerably as a result of the construction of Akosombo and Kpong dams. Ecological conditions suitable for spawning of clams have been altered by the high level of salinity

and change in the flow of the river. The spawning grounds have been choked with weeds. This has created favourable environment for the survival of aquatic snails, the intermediate hosts of bilharzia. These parasites have become major health hazards to people living by the river. Most of the streams and ponds or creeks which used to contain lots of fish have been completely depleted due to the absence of the annual flooding from the Volta which stocked them with fish. Apart from these, there are about 64 dams and ponds in the district which contain large stocks of fish; and there is a tremendous potential to develop fish farms.

4.17 Livestock

The livestock sector forms an integral part of the farming system in the Adidome district. More than 30% of the farming families in the district keep some ruminants. The Adidome District is among the three largest cattle producing areas in the country. Apart from the three cattle ranches at Aveyime, Amelorkope and Adidokpavu, individual farmers keep Kraals all over the district.

4.18 Livestock grazing

Ruminant production system in the district is under open grazing on natural pastures. The natural vegetation provides livestock feeds as animals are grazed on communal lands. Apart from established ranches no farmer grows fodder for livestock feed. The natural vegetation and drinking water for animals are insufficient to meet the requirements of the present livestock population. Owing to the inaccessibility of the district, the livestock sector is divided into three veterinary districts namely: Adidome, Aveyime and Juapong respectively.

The livestock production system depends on hired herdsmen or children of Kraal owners, who do not go to school; take care of the cattle. Sometimes the children go to school after completing the apprenticeship training in cattle herding.

The practice of cattle tenancy or "contract herding" where the real owners of the stock live in towns and other places engage in other businesses is widely practised in the district. The kraal owners usually have limited stock. This practice poses management problems in the industry. At times they are not ready to spend money on behalf of the real owners; the cause of spread of livestock diseases in the district (Psalm Consults, 1996).

The district has seen the introduction of new animal types in recent years. An Ostrich farm project has been established and located in the Dedukope area of the district.

4.19 Cattle Ranching

Aveyime Cattle Ranch is a European Economic Community (EEC) funded project. The project involves running a cattle ranch and an extension service. The extension service provides routine rinderpest immunization and dip tanks to cattle in the surrounding area. The ranch has 2,500 acres of fenced pasture and 2,300 herds of cattle. Overgrazing is observed and improved pasture grasses are being cultivated as well as fodder trees such as leucenia to provide fodder during the dry season.

4.20 Amelorkorfe Animal Breeding Station

This is one of the animal husbandry breeding stations established in the first republic. However, the project has been abandoned and all stock sold.

4.21 Markets

There are five main markets in the district; located at Mafi-Kumase, Mafi-Adidome, Mafi-Avedo, Juapong and Battor. These form the focus of commerce and trade in the district. The location of these markets, considering the size of the district implies that farmers have to convey their produce over long distances to the markets. The markets operate weekly or twice in a week. These markets depend on produce from farms around and traders who come from outside the District to either buy farm produce to go and sell or bring manufactured goods to the markets.

There are no hotels in the district. There is a small motel at Adidome and rest houses at Juapong and Kpedzegblo. There are Rural Banks and Agencies at Adidome, Battor, Mepe and Mafi-Kumase aside of the Agricultural Development Bank at Juapong. The small number of banks in the district is mainly due to the low level of economic activities. There is no insurance company in the district. Customers depend on other districts for such services.

4.22 Agro-forestry

Massive destruction of forests for farming, fuel-wood, charcoal burning, the clam shell industry as well as gari processing has occurred in the district. Interestingly, Agro-forestry projects have started springing up in the district. Some of these projects are observed at Podoe, Gidikpoe and Sasekpe locations in the district. Many schools have established woodlots and forested their compounds in the district.

4.23 Agro-processing

The major agricultural products processed in the district include gari, cassava dough, palm oil, kernel oil, local cheese(wagazi), local gin (akpeteshie), cotton into grey-baft and lumbering. Gari processing is done by women using various traditional methods at

Mafi-Kumase, Anfoe, Mawoekpor, Kpedzegblo, Juapong, Bakpa-Avedo localities. Indigenous technology and equipment are used besides grinding mills. The weakness of the traditional processing technology is low labour productivity. This led to the establishment of the Mafi-Kumase Gari Processing Factory by the National Council for Women and Development in 1980. The factory is however out of production, though the local industry still flourishes.

Distillation of palmwine from felled palm trees into local gin (akpeteshie) is a major occupation in the District. The Distillery Industry is well organised in the district with self-supporting co-operatives in almost all localities. Records from the societies indicate high production levels. The lucrativeness of the Distillery Industry has led to land litigation in some communities over Oil Palm plantations.

Another important agro-processing facility in the District is the Juapong Textiles Limited. It is the single largest factory in the District and in the Region. It employs about 2000 labour force. It imports cotton to spin into grey-baft for Ghana Textile Printing (GTP) which produces wax prints. Small users also include the Batik and Tie & Dye Industry. Some of the raw materials are also obtained from the Ghana Cotton Company in which JTL is a shareholder.

The main lumbering activity in the District is Borasus Palm (Agor). Local lumbering of the common Borasus palm is done around Mafi-Kumase, Sasekpe, Horkpo and Adexo. The beams obtained are used in the building industry. It provides the lumber for Kraals and buildings in the district.

4.24 Problems of agricultural development

According to Psalm Consults (1996) despite the agricultural interventions of VORADEP and FASCOM programmes in the Volta Region, "the agricultural sector has not undergone significant changes in the district over the years and remain significantly subsistence." The main obstacles to the adoption of improved farming practices include: over-reliance on the erratic rainfall; lack of access to information due to poor and inadequate road networks, making it difficult for extension officers to reach the farmers; high prices of farming inputs; lack of credit facilities; poor marketing due to poor transportation facilities and access to markets; high level of illiteracy among farmers; land tenure system; destruction of farms by livestock; bushfires; inadequate infrastructure such as irrigation facilities, motorable roads, dams; inadequate veterinary personnel; incidence and prevalence of livestock diseases such as sleeping sickness, rinderpest, anthrax, blackleg, new castle, and human diseases such as malaria, guineaworm and bilharzia which reduce labour capability and productivity.

CHAPTER 5

FARMERS' SOCIAL BACKGROUND AND PRACTICAL AGRICULTURE IN JUNIOR SECONDARY SCHOOLS

5.0 Introduction

The Middle School and Junior Secondary School leavers, the subjects of the study, come from similar social systems, have similar languages and with identical home backgrounds in informal training in farming. The generally poor performance of the educational system in the district (Psalm Consults, 1996) might have affected the two groups in different ways.

The study therefore assessed the social characteristic differences between Middle School and JSS graduates farming in the district in terms of gender, age, marital status and agricultural education backgrounds. The process of teaching and practice of practical work in agriculture in the district has also been assessed and discussed in this section of the report.

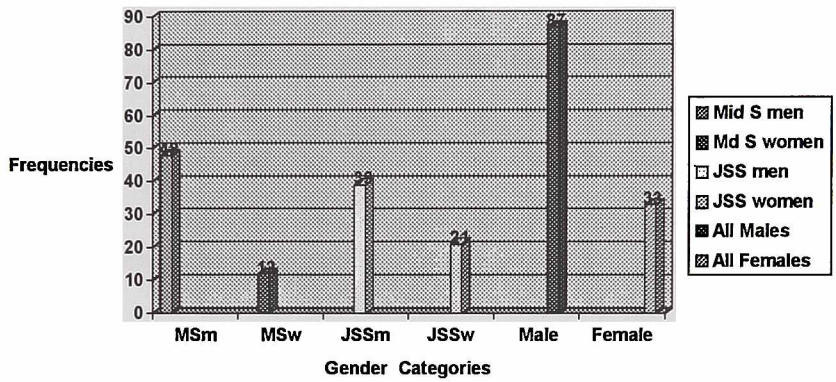
5.1 Social Characteristics of the respondents

The main social characteristics considered by the study include gender, age, period of leaving school, and agricultural education background.

5.1.1 Gender of the farmers

Gender is an important social construct which establishes the socially or culturally accepted roles of men and women, differentiates household production and consumption functions, demarcates areas of responsibility in farming, determines choice of crops, priorities and tasks in farming and the distribution of the benefits derived from farming between household members (Fieldstein and Poats 1989,

Fieldstein and Jiggins 1994). It is necessary to examine the gender composition of the young farmers in the North Tongu District in order to trace the links between it and performance of the young farmers. The gender distribution of the respondents is shown in Figure 5.1.



LEGEND: MSm = Middle School male. MSw = Middle School women
JSSm = Junior Secondary School male. JSSw = Junior Secondary School women

Figure 5.1: Frequency distribution of the respondents by gender

Source: The Study

Figure 5.1 shows that the respondents consist of more males than females. Middle School females (MSw) form the minority of the respondents. It was difficult to locate Middle School female farmers during the period of the study. This is probably due to the low primary school enrolment rate in the late 1970s and 80s. The average annual growth rate in primary school enrolment between 1980/81 to 1987/88 for Ghana was 1.59 percent as against a population growth rate of 3 per cent for school-going aged children, World Bank, (1989). The drop-out rate was 71 per cent in some schools. But in the North Tongu District which was then part of the Sogakope District, Middle School enrolment ratio of girls to boys in 1985 / 86

academic year was 1:1.8 (GES,1986). It implies that many girls did not attend Primary school at that time to complete Middle School between 1985 and 1990. Some of the few girls that terminated schooling after Middle School between 1985 to 1990 and resided in the district might have engaged in employment in other economic activities such as dress making trading and the like. It is also possible that they might have married and migrated to settle in other parts of the country.

It was quite easy to locate both male and female JSS graduates in farming in the area as indicated by their frequency distribution in the sample of 39 and 21 respectively. This is probably due to the higher primary school enrolment rate of girls in that educational era which was 78.3 percent on average, (GES 1986).

5.1.2 Age of the respondents

Age is an important social characteristic that determines transitional periods in the life of an individual and categorizes people into children, teenagers, young adults, mature adults and old age (Giddens 1994). Age brings about changes in growth and in the physical, biological and psychological development of people and determines allocation of tasks in farming. It determines periods of exposure to social experience, level of knowledge; goals in life, self-supportiveness and role expectations. The study considered it worthwhile to examine the age of the young farmers in North Tongu District. Table 5.1 shows the mean age distribution of the respondents.

Table 5.1: Age distribution of the farmers

Respondent category	Age Range and mean age in years.....	
	Age Range	Mean Age
Middle School leavers (MS)		
MS male (N=48)	21-34	28.4
MS female (N=12)	19-34	26.2
All MS (N=60)	19-34	27.3
JSS leavers (JSS)		
JSS male (N=39)	15-30	22.5
JSS female (N=21)	15-27	21.0
All JSS (N=60)	15-30	21.8

Source: The Study

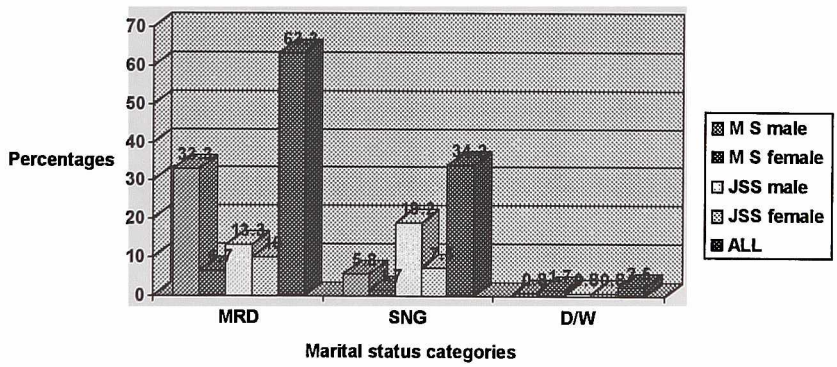
Table 5.1 indicates that the age range of the respondents is 15-34 with an average age of 24.6 years. Middle School leavers form the older group of respondents with an age range of 19 -34 and a mean of 27.3 years while the Junior Secondary School graduates are younger with a range of 15 -30 and a mean of 21.8 years. The oldest people among the respondents are male Middle School males with a mean age of 28.4 years. Middle School females come second with a mean age of 26.2 years, while JSS males are third at 22.5 years and JSS females placed fourth with a mean of 21.0 years.

The age structure of the respondents categorizes them into pre-adulthood and early adulthood (Levinson, 1986 quoted in Boyd 1989). Those below 18 years are in the period of pre-adulthood while those above are in early adulthood. The young farmers below 18-year cohort are young and would experience the crisis of dependency and independency (Boyd 1989). The two respondent cohorts (pre-

adulthood and early adulthood) fall in the life era when they will develop dreams for their lives and in the stages to select and modify occupations (Boyd 1989).

5.1.3 Young farmers and marital status

Marriage is a factor that affects the way of life of a person, imposes strains, difficulties, responsibilities and challenges on an individual (Giddens 1994). Marriage therefore affects ones aims, rights and responsibilities and freedom to travel. An important output of marriage is childbearing. Married women have to take extra responsibilities in caring for young children. Stroh and Keating, (1989), indicated that marriage brings along with it support from spouse which keeps stress low among farm families. All these conditions, roles and responsibilities in marriage make it important for the study to examine the marital status of respondents. The marital status distribution of the young farmers is shown in Figure 5.2.



LEGEND: MRD = Married. SNG= Single. D / W= Divorced or Widowed

Figure 5.2: Bar chart of percentage distribution of the respondents by marital status

Source: The Study.

Majority of the respondents, (63.3%), are married persons. Quite a substantial number of them too are single constituting 34.2 percent of all the respondents, an indication of a tendency to be unstable in farming since they do not have child bearing and upbringing responsibilities (Giddens, 1994). It is interesting to note that majority of the spinsters among the respondents are JSS graduates because they are generally younger than Middle School leavers. The spinsters form 38.3 percent of all the JSS graduates. A minority of the respondents consisting of 2.5 percent of all the respondents are divorced or widowed, suggesting that single parenthood, which can produce stressful conditions, among the young farmers is low.

5.2 Agricultural Education background of the respondents

The study assesses the background training of the Young Farmers in formal and informal agricultural education. Since the type of training received affects the performance of people in farming, the study assessed the background training of the Young Farmers in that respect. Information sought from the Young Farmers include home-farming experience (raising crops and or animals while attending school), frequency of applying school-based agricultural knowledge in home-farming, frequency of attending field trips while in school and experience in cattle herding.

5.2.1 Childhood farming and farm ownership

The results of the responses to questions on childhood farming, farm ownership and cattle herding experience of the respondents are shown in Table 5.2.

Table 5.2: Percentage distribution of respondents by childhood farming, farm ownership and cattle herding experience.

Respondents %number of respondents who received respective type of Home Training in farming while in school....

	Childhood Training	Non-Childhood Training	Farm Owners	Non-Farm Owners	Cattle Herders
Middle School leavers.					
MS male (N=48)	100.0	0.0	89.6	10.4	20.8
MS female (N=12)	100.0	0.0	75.0	25.0	0.0
All MS (N=60)	100.0	0.0	86.7	13.3	16.7
JSS leavers					
JSS Male (N=39)	97.4	2.6	82.1	17.9	20.5
JSS Female (N=21)	100.0	0.0	57.1	42.9	0.0
All JSS (N=60)	98.3	1.7	73.3	26.7	13.3
All the Farmers (N = 120)	99.2	0.9	80.0	20.0	15.0

Source: The Study

From Table 5.2, majority (99.2%) of the respondents had childhood agricultural training at home which consists of 100.0 and 98.3 percent Middle School and JSS graduates respectively. As high as 80 percent of all the respondents had their own small farms while 20 percent of them did not own farms but assisted their parents.

5.2.2 Home training in cattle keeping

Cattle Keeping is one of the most important agricultural occupations in North Tongu District. In fact, its importance to the people is rated on equal level as cocoa farming in cocoa growing areas of Ghana (Volta Region Cattle Farmers Association 1992). The distribution of the respondents on the basis of childhood cattle keeping experience is also shown in Table 5.2.

It is interesting to note from Table 5.2 that a total of 15.0 percent of the young farmer respondents served as cattle herders in their childhood. That number is made up of 20.8 and 20.5 percent Middle School and JSS leavers respectively.

5.2.3 Use of School agricultural knowledge in home-farming

The application of formal knowledge in home-farming is assessed for the farmers. The farmer respondents were asked to indicate the frequency of using their new

agricultural knowledge in home-farming. The frequency levels are 'never', 'sometimes' and 'always'. For simplicity in analytical purposes, the response categories, 'sometimes' and 'always' is merged into 'ever used' while "never" stands for not used. The results are shown in Table 5.3.

Table 5.3: Percentage distribution of respondents by the use of school agricultural knowledge in home farming.

Respondents % respondents in respective frequency of use of school knowledge in home farming while in school…

	NEVER	SOMETIMES	ALWAYS	EVER USED
Middle School leavers				
MS Male (N=48)	56.3	33.3	10.4	43.7
MS Female (N=12)	91.7	8.3	0.0	8.3
All MS (N=60)	63.3	28.4	8.3	36.7
JSS leavers				
JSS Male (N=39)	25.6	43.6	30.8	74.4
JSS Female (N=21)	47.6	42.9	9.5	52.4
All JSS (N=60)	33.3	43.4	23.3	66.7

Source: The Study

Table 5.3 shows that the young farmer respondents practise home-farming within a high level of non use of school knowledge. On average, 48.4 percent of them said they never used their school knowledge in home farming. Junior Secondary School graduates use more school agricultural knowledge in home farming than Middle School leavers. Middle School females experience the highest level of non use of school knowledge, followed by Middle School males, JSS females and JSS females in that order.

The finding also suggests that JSS graduates use more new knowledge in home-farming than Middle School leavers. JSS males use knowledge in home-farming more than all the other groups of respondents. They are followed by JSS females, Middle School males while Middle School females come last.

The findings suggest that the JSS Agriculture programme might have given more relevant knowledge to the graduates, hence their higher use of knowledge in home-farming than the Middle School leavers. The lower use of knowledge of Middle School females and females in general tend to be supported by the resistance they experienced from their mothers. Some of the females said their mothers did not allow them to apply farming practices they learnt in school because they were time consuming.

From Table 5.2 and 5.3 it can be inferred that majority of the young farmers have informal training under the tutelage and supervision of their parents. Since females were denied the chances of applying their new agricultural knowledge in home-farming, they might have experienced a higher level of cognitive dissonance condition (Thompson 1983). If the cognitive dissonance condition is not remedied early it leads to a state where the learners would discard what is learnt as they perceive it as unimportant (Hartmut et al 1989).

The high level of non use of school knowledge in home-farming experienced by the farmers tends to suggest that a sizeable number of them may develop a reduced importance for what they learnt in agriculture at school by the time they enter into career farming.

With respect to home training in farming, it can be concluded that majority of the respondents have quite extensive informal exposure to practical experience in farming in the North Tongu District. But, the apparently high level of non application of school agricultural knowledge may detract from the benefits of home training in farming particularly with Middle School leavers.

Experience from the district tends to suggest that many school pupils sponsor themselves in school. The high level of in-school youth owning farm enterprises at such tender ages suggests self-sponsorship in schooling. The school pupils may be raising crops and animals in order to generate income to support themselves in school. But this does not suggest that they may be using school-based knowledge. It is possible they might be using Indigenous Technical Knowledge in agriculture in home-farming as suggested by the findings. This may adversely affect their schooling output since they may have a divided attention between farming and schooling as suggested by the generally poor performance of the educational system in the district, (Psalm Consults 1996).

5.2.4 Field Trips

An important educational practice purposely designed to expose in-school youth to new developments in agricultural production is the organization of field trips to established farms, agricultural projects or research stations (Olaitan and Onazi 1989). The study finds out the level of exposure the young people have to new and improved agricultural production practices through participation in field trips. The responses of the respondents on field trip attendance is shown in Figure 5.3.

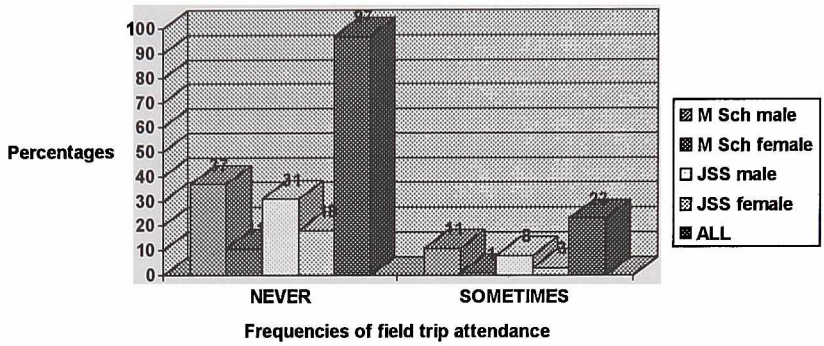


Figure 5.3: Bar chart of percentage attendance of field trips by farmers
Source: The Study

Figure 5.3 shows that only 18.3 percent of all the respondents ever attended field trips in the Middle School and in the JSS agricultural education programmes in the North Tongu District. However, 20 percent of Middle School leavers participated in field trips while 16.7 percent of the JSS graduates benefited from it.

This suggests low attendance of field trips by the formal agricultural educational systems in the district. Again, there is lack of large-scale commercial farm enterprises, projects or research stations which schools can visit in the district. It is evident that whereas the informal agricultural education system caters for the training of majority of the respondents, the formal education system lacks important strategies for effective practical agricultural education of the young farmers in the North Tongu District.

5.3 Management of Agricultural Education Programmes in the district

The study assessed the implementation process of the formal and Extension agricultural education systems to show how the educational systems influenced the

attainments of the farmer respondents while in school and out-of-school.

5.3.1 Management of Practical Agriculture in Junior Secondary Schools

The process of implementing an educational programme affects its outputs (Avortri and Asiegbor 1997). Effective implementation of a programme depends a great deal on the calibre of the implementers. Since the study is on the utilization of school-based agricultural knowledge, the study assesses the process of teaching and practice of practical work in agriculture in Junior Secondary Schools by examining the quality of staff at the district office in charge of the programme and the inputs for practical farm work in the schools. Practical farm work at school is intended to offer opportunities to pupils to utilize school-based agricultural knowledge.

5.3.2 Quality of District Agricultural Education Staff

The demographic information on the District Agricultural Education Co-ordinator (DAEC) is presented in Table 5.4.

Table 5.4: Social Characteristics of the DAEC.

Question Item	Response
Qualification	B.Ed Hons
Subject of specialisation	Social Studies
Number of years in teaching	21 years
Number of years in teaching Agriculture	0.0 years
Position or Schedule	Peripatetic / Agricultural Education

Source: The Study

The background information from Table 5.4 indicates that the District Agricultural Education Co-ordinator position is occupied by an officer who had no training or experience in teaching the subject. This was a significant factor influencing the management of the JSS Agriculture programme in the North Tongu District.

The DAEC and JSS Agriculture Teachers were to indicate the availability and adequacy of material resources for the implementation of the practical component of the programme, time allocation for practical work and theory, guidelines for managing school farms, and availability of average crop yield figures from school farms in the district. The responses to the items are presented in Tables 5.5 and 5.6.

Table 5.5: Distribution of DAEC and JSS teachers by availability of some selected resources for teaching practical agriculture.

Resources	DAEC, Teachers and % number of schools with the resources.....	
	% practical work resource availability in JSS schools	
	DAEC (N=1)	Teachers (N=8)
Weighing Scale	0.0	0.0
Measuring Tape	0.0	25.0
Knapsack Sprayer	100.0	75.0
Ranging Pole	0.0	0.0
Burdizzo	0.0	0.0
Laboratory	0.0	0.0
Vegetable Unit	95.7	87.5
Arable Crop Unit	98.6	87.5
Livestock Unit	0.0	0.0
Fish Pond	0.0	0.0

Source: The Study

Table 5.5 shows that material resource allocation for practical work is inadequate because none of the items listed have been adequately available at school level. That aside, there are inconsistencies in the data given by the DAEC and the information from the teachers in the schools in the case of Knapsack Sprayer, Vegetable Unit and Arable Crop Unit. The inconsistencies suggest lack of information from the schools by the DAEC. If proper monitoring is carried out, it should be known that not all schools have the materials listed.

5.3.3 Time Allocation for theory and practical work

The study finds out that the district is not consistent in time allocated for theory and practical lessons in Agriculture. Theory lessons per week have a range of 1-3 hours, with a mean of 2.5, while practical lessons have a range of thirty minutes to five hours with a mean of three hours. This is supported by observation of pupils involvement in manual work in the district, a whole day is declared "project day". This practice makes pupils spend one day (8 hours) per week on farm work or other jobs such as carting blocks, bricks, sand, gravel and allied tasks to generate income for the school. Such activities are carried out without any specified educational objectives.

The DAEC and Teachers were asked to indicate whether they have guidelines for managing school farms and the keeping of records on yield from school farms. Their responses are shown in Table 5.6.

Table 5.6: Distribution of DAEC and Teachers by availability of guidelines for managing school farms and keeping yield records.

Information	% respondents in positive responses to the items	
	DAEC (N=1)	Teachers (N=8)
Guidelines	0.0	0.0
Average yield records	0.0	12.5

Source: The study.

Table 5.6 shows that no guidelines have been provided for the schools on which to base practical work in school farms. Only 12.5 % of the schools said they keep yield records on their school farms. The findings give an indication that no attainment standards have been set up for the schools. Each school in the District does what it can in terms of the teaching of practical work in agriculture.

5.4 Basic Schools and Agricultural Production in North Tongu District

The interrelationships between the JSS Agricultural Education programme and the agricultural production system in the North Tongu District was traced. First, the extent of coverage of on-farm agricultural occupations in the district by the JSS programme was assessed. This was done by preparing an inventory of agricultural occupations in the district using information provided by Agricultural Extension Agents.

5.4.1 Inventory of On-Farm Agricultural Vocations

The Agricultural Extension Agents were asked to provide information on the number of on-farm enterprises in their operational zones in the North Tongu District. The responses are summarised in Table 5.7.

Table 5.7: Number of on-farm enterprises in the North Tongu District.

Type of on-farm Agricultural Vocation	Number of Vocations
Animals	15
Cereals	3
Food Processing	7
Fruits and Tree Crops	5
Industrial Crops	3
Legumes	4
Lesser Fruits	5
Root and Tubers	6
Vegetables Crops	7
Total	55

NB: Actual names of the vocations can be found in appendix 6.

Source: The Study

Table 5.7 shows that a total of 55 on-farm enterprises are known to be practised in the District at the period of the study. While majority of them are traditional on-farm enterprises, some are new introductions. One of the newly introduced on-farm vocation is Ostrich farming. Some of the indigenous ones like Fan Palm Yam production is not even documented although it forms an important economic activity

for farmers in the dry season particularly in areas where the Fan Palm or Borassus Palm exists.

It is clear that the JSS Agricultural Education programme does not cover all the on-farm enterprises which are practised by the graduates of the programme in the district.

5.5 Extension Programme for Young Farmers

In order to raise agricultural productivity, young people must be involved in it (MOE 1986, Ghanaian Times 1999). Since Agricultural Extension disseminates new knowledge and improved agricultural technologies from research to farmers, young and prospective farmers need to be linked with Agricultural Extension so that they will be aware of its value. The study sought information from the District Director of Agriculture and Frontline Agricultural Extension Agents on the activities the Extension system performs in Junior Secondary Schools in the North Tongu District.

The District Director of Agriculture was asked to indicate whether there was a support system or scheme for young farmers; whether the district has average crop yield figures and to rate young farmers' access to agricultural production resources.

The answers to all the questions are negative. The responses of the District Director of Agriculture show that the young people who become farmers in the district are not cared for by the Agricultural Extension Education system as such.

The Agricultural Extension Agents were asked to provide the following information:

- Number of years spent in the District.
- whether they (AEAs) give demonstrations on new agricultural technologies introduced into the District after 1987 to JSS students in school.

- ❖ whether the Extension system has a programme for young farmers.
- ❖ whether the AEAs identify young people who enter into farming every year and
- ❖ what agricultural technologies they teach JSS graduates farming in their operational areas.

The AEAs' who gave positive responses to the above questions have been counted and presented in percentages in Table 5.8.

Table 5.8: Percentage distribution of AEAs by positive responses to items on Extension programmes for young people.

AEAs	Number of years and % respondents in respective positive item responses				
	No. Years (Q1) Range & mean age	Demonstrations (Q2) % YES	Programme (Q3) % YES	Identification(Q4) % YES	Technologies (Q5) % YES
AEAs (N=10)	2-10 *(6)*	20.0	60.0	80.0	50.0

Source: The Study NB: *Average number of years in the District in parenthesis italic*

Table 5.8 shows that the Agricultural Extension Agents work quite long in the district with an average of six years experience. However, only 20.0% of them said they ever gave demonstrations on new agricultural technologies to Junior Secondary School students in the district. When those who said 'no' to the question were asked why they did not give demonstrations, the commonest answers were "the teachers felt as if I was imposing my ideas on them,.... they did not form part of my target group....",

While 60.0% of the AEAs said they had programmes for young farmers thereby contradicting the response from the Director of Agriculture, 80.0% said they identify young people who enter farming every year. This contradicts the information from the JSS graduates that some of the AEAs do not know that they (JSS leavers) are farmers and therefore do not visit them.

When those AEAs who said they visited Young farmers were asked to state the types of agricultural technologies they taught them, some of their responses include: "line planting, germination test demonstration, agro-forestry, lining and pegging and crop rotation."

Clearly, there are inconsistencies and contradictions in their responses as compared to that of the Director of Extension Services and among themselves. Some of the technologies like row planting and crop rotation could not have been the need of JSS graduates since they would at least, have been taught at school.

To sum up, it can be inferred from the discussion that the Agricultural Extension system appears to distance itself from the future and prospective farmers in the district because no programme is designed to target them as an identified group. Secondly, there appears to be lack of co-operation between JSS Agriculture Teachers and Agricultural Extension Agents (AEAs) in the district.

5.6 Summary

The chapter also identifies several social characteristic differences between the Middle School and Junior Secondary School graduates farming in the North Tongu District. Gender, age, marital status and agricultural education and training differences have been noted between the respondents. Middle School graduates form majority of the men. They are also the older group of the respondents while Middle School women constitute the least number but belong to a higher age cohort than their JSS counterparts.

Junior Secondary School graduates are younger than Middle School leavers. A higher percentage of the Middle School leavers are married but majority of the JSS are single. Divorce and widowhood is minimal among the young farmers.

The agricultural education background of the respondents shows a high level of home training in farming. A high proportion of the respondents owned and operated farm enterprises in their childhood but less than half of their number applied what they learnt from school in their early farming experience.

A small number of the young farmers from Middle School and JSS graduates had cattle herding experience in childhood. Agricultural Education experience through field trip attendance at school was generally low.

This chapter shows that practical farm work instruction and practice are poorly done in the schools. The Agricultural Extension system in the North Tongu District does not cater adequately for Junior Secondary pupils.

CHAPTER 6

AGRICULTURAL KNOWLEDGE OF MIDDLE AND JUNIOR SECONDARY SCHOOL GRADUATES

6.0 Introduction

One cannot utilise knowledge that one does not have. Since the study is about the effects of use of formal agricultural knowledge for farming, the formal agricultural knowledge levels of the young farmers have been assessed as presented in this chapter.

6.1 Assessment of agricultural knowledge levels.

In assessing the formal agricultural knowledge levels of the respondents, five multiple response test items have been used. The test items seek for application of agricultural knowledge on: interpretation of fertilizer labels (FTLZ), the concept of concentration in mixing pesticides (PST), application of gestation period in sheep breeding (SHP), estimation of crop yields (YLD) and calculation of farm earnings (NFM).

The results of the performance of the respondents on the test items are shown in Table 6.1.

Table 6.1: Distribution of respondents by percentage number in correct test options.

Respondent categories	Type of test items and % number of respondents in correct test options.					
	Fertilizer	Pesticide	Sheep	Yield	Farm Earnings	Mean Correct Options
Middle School Leavers						
MSm (N=48)	22.2	87.5	12.5	6.3	97.9	45.4
MSw (N=12)	16.7	91.7	16.7	0.0	83.3	41.5
All MS (N=60)	21.7	88.3	13.3	3.2	95.0	44.7
JSS leavers						
JSSm (N=39)	25.6	82.1	53.8	5.1	84.6	50.2
JSSw (N=21)	19.0	61.9	71.4	0.0	81.0	46.7
All JSS (N=60)	23.3	75.0	60.0	2.6	85.0	49.3
All respondents	22.5	81.7	36.7	2.9	90.0	47.0

Source: The Study.

Table 6.1 shows that the Middle School leavers and JSS graduates did very poorly on the test items on estimation of crop yields and interpretation of information on fertilizer labels. Their performance on fertilizer labels determined on the basis of type of school attended is 21.7% and 23.3% respectively for Middle School and JSS while that on yield estimation is 3.2% and 2.6%.

On the basis of gender, the females perform worse than males on the test items on fertilizer labels and yield determination.

Both Middle School and JSS graduates do not depart far from each other in their performance on the two test items. The low performance of the respondent categories

on fertilizer label and yield determination test items suggests knowledge deficiency on the concepts.

Referring from Table 6.1, JSS graduates have a mean correct options of 49.3 percent while Middle School leavers have 44.7 percent. The average score of JSS leavers is 4.6 percent higher than that of the Middle School graduates.

On gender, 45.4% of Middle School males have all the test item correct while 41.5% of their female counterparts have all the test items right. Nearly half (50.2%) of the JSS males have all the test items correct with JSS females at 46.7%. In all, more of the JSS graduates score the tests items correctly than Middle School leavers while males also score more than the females.

6.2 Differences in Agricultural Knowledge levels of Farmers

To test whether there is a difference between the JSS and Middle School leavers on the levels of agricultural knowledge, the Wilcoxon-Mann-Whitney Test statistic is employed. The Null Hypothesis (H_O) is JSS and Middle School leavers come from the same population and therefore have no difference in retained agricultural knowledge levels.

Thus, $H_{o,} = P[W_{JSS} > W_{MS}] = ½$, where W_{JSS} is the sum of the ranks of the number of JSS graduates scoring the test items correctly and W_{MS} is the sum of the ranks of the number of Middle School leavers scoring the test items correctly. The relationship between JSS and Middle School leavers on the test items as determined by Wilcoxon-Mann-Whitney Test is shown in Table 6.2.

Table 6.2: Difference in Agricultural Knowledge levels of Middle School and Junior Secondary School graduates as measured by Wilcoxon-Mann-Whitney Test.

Number of respondents in correct test options	2.6	3.2	13.3	21.7	23.3	60.0	75.0	85.0	88.3	95.0
Categories of respondents	JSS	MS	MS	MS	JSS	JSS	JSS	JSS	MS	MS
Rank	1	2	3	4	5	6	7	8	9	10
$W_{JSS} = 1+5+6+7+8=27$										
$W_{MSM} = 2+3+4+9+10=28$										
$H_O = P[W_{JSSM} > W_{MSM}] = 1/2 =$ But,, $P[27>28] = .500$; where, $n = 5, m = 5$										

Legend: W_{JSS} is the sum of the ranks of the number of JSS graduates scoring the test items correctly
W_{MSM} is the sum of the ranks of the number of Middle School leavers scoring the test items correctly
Source: The Study

Table 6.2 shows that the Null Hypothesis is true since $P[W_{JSS} > 28] = .500$. This implies that no significant difference exists in agricultural knowledge levels between Middle School leavers and JSS graduates farming in the North Tongu District.

The performance of the Middle School and JSS graduates shows that the knowledge retained by the two groups does not differ from each other. This suggests that the effect of forgetting on knowledge imparted through Basic School Agriculture does not depend on the academic nature of the programme in the district. Since the JSS Agricultural programme is more academic than the Middle School one, the former should have kept more knowledge than the latter. Despite the comprehensiveness of the JSS Agricultural Education programme, no difference exists in the knowledge retained by the graduates and Middle School leavers. The knowledge levels of JSS males and Middle School males are compared as presented in Table 6.3.

Table 6.3: Difference in Agricultural Knowledge levels of Middle School males and Junior Secondary School males as measured by Wilcoxon-Mann-Whitney Test.

Number of respondents in correct test options	5.1	6..3	12.5	22..2	23.3	25..6	53.8	82.1	87.5	97.9
Categories of respondents	JSSM	MSM	MSM	MSM	JSSM	JSSM	JSSM	JSSM	MSM	MSM
Rank	1	2	3	4	5	6	7	8	9	10
$W_{JSSM} = 1+5+6+7+8=27$										
$W_{MSM} = 2+3+4+9+10=28$										
$H_O = P[W_{JSSM} > W_{MSM}] = 1/2$ = But, $P[27 > 28] = .500$; where, n=5, m=5										

Legend: W_{JSSM} is the sum of the ranks of the number of JSS Men scoring the test items correctly
W_{MSM} is the sum of the ranks of the number of Middle School Men scoring the test items correctly
Source: The Study

Table 6.3 shows that the Null Hypothesis is true since $P[W_{JSSM} > 28] = .500$. This implies that no significant difference exists in agricultural knowledge levels of Middle School males and JSS males. The knowledge levels of JSS and Middle School females are compared as shown in Table 6.4.

Table 6.4: Difference in Agricultural Knowledge levels of Middle School females and Junior Secondary School females as measured by Wilcoxon-Mann-Whitney Test.

Number of respondents in correct test options	0.0	0.0	16.7	16.7	19.0	61.9	71.4	81.0	83.3	91.7
Categories of respondents	JSSf	MSf	MSf	MSf	JSSf	JSSf	JSSf	JSSf	MSf	MSf
Rank	2	2	4	4	6	7	8	9	10	11
$W_{JSSF} = 2+6+7+8+9=32$										
$W_{MSF} = 2+2+4+4+10+11=33$										
$H_O = P[W_{JSSF} > W_{MSF}] = 1/2$ = But, $P[32 > 33] = .1548$; where, n=5, m=5										

Legend: W_{JSSF} is the sum of the ranks of the number of JSS Females scoring the test items correctly
W_{MSMF} is the sum of the ranks of the number of Middle School Females scoring the test items correctly
Source: The Study

Table 6.4 shows that the Null Hypothesis is not true since $P[W_{JSSF} > 33] = .1548$ and at the upper tail end (C_L), $P[W_{MSF} > 32] = .8452$. This implies that a significant difference exists in agricultural knowledge levels of Middle School females and JSS females farming in the North Tongu District.

The performance of the Middle School and JSS graduates and males suggest that the effect of forgetting on knowledge acquired from a training programme does not depend on whether the programme is either only practical or comprehensive (theoretical and practical). In conclusion, the type of Basic School agriculture programme pursued by the Middle School and JSS graduates cannot not be used to explain fully their performance on the test.

6.3 Time of Leaving School and Performance on test

The difference between the performance of those who left school more than six years ago and those who completed in less than six years was compared as shown in Table 6.5.

Table 6.5: Percentage distribution of respondents on correct test options by number of years of leaving school.

No. of years of leaving school	Type of Test Items and percentage number of respondents who had correct responses					
	Fertilizer	Pesticide	Sheep	Yield	Net Farm Margin	Mean
Below 6 years (Y6-) (N=51)	38.1	73.7	55.8	3.9	78.3	50.0
Over 6 years (Y6+) (N=69)	21.7	86.9	23.2	4.3	92.6	45.7

Source: The Study.

The mean number of respondents in correct test options shown in Table 6.5 indicates that more of the respondents who terminated school in the last six years have more correct test items than those who left school over six years ago. It implies that many more of the recent school leavers retain more knowledge on the average among the respondents. The young people are fresh from school and therefore remember and reproduce the knowledge they acquire better than those who completed school earlier because knowledge stored in memory fades with time especially if it is not used (Chaplin and Krawiez 1974, Bajah 1990).

The performance of the respondents on the test by the tome of leaving school is tested to find out if any significant difference exists between the two groups, the results are shown in Table 6.6

Table 6.6: Difference in Agricultural Knowledge levels of Recent and Old graduates as measured by Wilcoxon-Mann-Whitney Test.

Number of respondents in correct test options	3.9	4.3	21.7	23.2	38.1	55.8	73.7	78.3	86.9	92.6
Categories of respondents	Y6-	Y6+	Y6+	Y6+	Y6-	Y6-	Y6-	Y6-	Y6+	Y6+
Rank	1	2	3	4	5	6	7	8	9	10
$W_{Y6-} = 1+5+6+7+8=27$										
$W_{Y6+} = 2+3+4+9+10=28$										
$H_O = P[W_{Y6} > W_{Y6+}] = 1/2$ But, $P[W_{Y6-} > 28] = .500$; where, n = 5, m = 5										

LEGEND: Y6- is recent graduates who completed school less than six years ago.
Y6+ is old graduates who completed school more than six years ago.
Source: The Study

Table 6.6 shows that the Null Hypothesis is true since $P[W_{Y6-} > 28] = .5000$. The results of the test shows that no significant difference exists in knowledge of the respondents who

left school in the past six year (Y6-) and those who completed schooling over six years ago (Y6+). It implies that the performance of the respondents does not associate positively with the years of leaving school.

In effect, the performance of the respondents on the individual test items cannot be explained fully by the differentiation of the respondents on the basis of period of leaving school. It appears that individual differences between the respondents influence their knowledge levels rather than period of leaving school.

To further explain the test results, the respondents are traced to identify links between their performance on the test items and farming activities that involve the utilisation of the agricultural knowledge tested by the items. The performance of the respondents on each test item divided them into two groups: namely; those who have a particular item correct and those who have it wrong. The study therefore disaggregates the respondents into two categories on the test items, namely; correct respondent category and wrong respondent category for comparative purposes. The two categories of respondents are traced to determine their level of participation in farming activities involving the utilization of agricultural knowledge tested by each of the items.

6.4 Performance on fertilizer test.

The test item on fertilizer labels is testing application of literacy in farming. First, lack of knowledge can be due to non-availability of the knowledge in the school system or the social experience. Examining the JSS syllabuses on fertilizers, the information they convey does not include fertilizer labels nor is it stated as objectives of the programme. However textbook 3 discusses fertilizers on pages 43 to 47 but how fertilizers are

compounded and labelled is not part of the contents (MOE, 1993). It is likely that interpreting information on fertilizer labels is not an identified knowledge to be learnt by the young farmers while in school. It appears that there is a mis-match between knowledge tested and that of the JSS agriculture programme.

However, it is possible that resourceful teachers can teach such knowledge to their students. It is obvious that the above explanation alone cannot explain fully the entire observation as indicated by the performance of the respondents because some of the farmers had the item correct. They could have learnt it through social experience.

Another approach to explain the finding is that if the teachers teach the students about fertilizer labels and their importance the young farmers can forget the knowledge out of disuse and therefore are not able to manifest it in answering the test item. It is therefore necessary to trace those who correctly score the test items to see if they practise farming activities that involve the use of fertilizer knowledge. The farming activities associated with fertilizer knowledge utilization covered by the study is application of fertilizers. The levels of fertilizer usage is examined to find out if there is any link between it and performance on the test item as shown in Table 6.7.

Table 6.7: Percentage distribution of respondents who pass or fail the test on fertilizers by Fertilizer Applicaton.

Fertilizer Test Score Categories	% Number of respondents who apply fertilizers
Correct (N=27)	25.9
Wrong (N=93)	26.9

Source: The Study

The result in Table 6.7 indicates that 25.9 percent of those who get the test item correct apply fertilizers while 26.9 percent of those who get the test item wrong also apply fertilizers. The observation that those who fail the test item also apply fertilizers almost equally shows that fertilizer application is not the only factor in explaining the knowledge levels of the respondents who correctly score the fertilizer test item.

Examining the performance further, those who get the test item correctly are traced in their usage of fertilizers by type of school attended and gender as shown in Table 6.8.

Table 6.8: Distribution of respondents who score the fertilizer test item correctly by application of fertilizers.

Correct Fertilizer Test Categories	% Number of respondents who apply fertilizers
Middle School leavers	
MSm (N=11)	36.4
MSw (N=2)	50.0
Total MS (N=13)	43.2
JSS leavers	
JSSm (N=9)	11.1
JSSw (N=4)	0.0
Total JSS (N=13)	5.6

Source: The Study

On the basis of application of fertilizers as Table 6.8 indicates, more Middle School females who pass the test apply fertilizers than Middle School males and JSS men. Thus, it can be concluded that the test scores of Middle School females can be affected by their application of fertilizers, followed by Middle School males and JSS males in that order.

In effect, it can be concluded that the differences observed in the performance of the respondents on fertilizer test item is not associated with attendance of JSS or Middle

School nor participation in fartilizer application but rather, a mis-match between school knowledge and the test item and the period of leaving school. It is likely that another factor may account for the performance of the respondents which is not captured by the study.

6.5 Performance on farm output measurement test.

The poor performance of the Middle School and JSS graduates on measuring crop yields is an indication of a poor connection between school-based agricultural knowledge and farming. The issue is traced to the contents of the syllabuses and textbooks. An important content young people need to learn to be able to determine crop yields is standard units of measuring farm output, (Dupriez and De Leener, 1988). A close scrutiny of the syllabuses and textbooks indicates absence of standard units of measuring farm output. The students might not have learnt nor determined yields from school farms let alone their own farms. This is supported by the absolute absence of crop yield efficiency figures, school farm yields and district yield standards as shown in Chapter 5 of the study.

The young farmers do not know standard farm size measurement units particularly, the hectare. They do not know the difference between an acre and a hectare. No agricultural research institutes work in the district and therefore no proper linkage is forged between scientific measurement of crop yields and learning in schools in the district. Yield estimation in the North Tongu District depends on indigenous units of measurement. The general inaccessibility of new agricultural research findings to agricultural education particularly at the pre-university level in Ghana identified by CRI (1995) is quite pronounced in the district.

Seeking for explanation for the observed knowledge levels, the young farmers who have the item correct are compared to those who fail the test item on the farming activity - measurement of crop yields. The result is shown in Table 6.9.

Table 6.9: Distribution of respondents who correctly score the item on farm output measurement and those who fail by their level of participating in yield measurement.

Test Score Categories	% Number of respondents who measure farm output.
Correct (N=5)	80.0
Wrong (N=115)	58.3

Source: The Study.

From Table 6.9, eighty (80.0%) of the young farmers who score the item correctly measure yields from their farms. But only 58.3 percent of those who got the test item wrong said they measure yields from their farms. As already indicated in the study, farm output measurement in the district depended on indigenous measuring units. It is therefore possible that farmers who said they measure yields use the local units of measurement instead of standard units.

In conclusion, the poor performance of the Middle School leavers and JSS graduates on the test items on fertilizer labels and crop yield determination suggests a fundamental agricultural education curriculum weakness in Sub-Saharan African Countries identified by Wallace et al (1996). As a result of lack of identification of training needs of prospective agricultural workforce, curricular contents tend to be supply-driven instead of demand-driven, neglecting knowledge and skills demanded by the emerging private sector agricultural industry. If the job profiles of the Middle School and JSS products

were identified before designing the programme, crop yield measurement would have been identified and incorporated into the curriculum.

6.6 Performance on sheep breeding test

Inferring from Table 6.1, more JSS graduates demonstrate possession of knowledge in sheep breeding than Middle School leavers. To explain the disparity in the observation, the contents of the JSS agriculture syllabuses and textbooks were examined. The gestation period in sheep, goat, cattle and other animals are extensively discussed in textbook 2 page 95 to 127 (MOE, 1993). This implies that JSS leavers have a fair knowledge in sheep breeding.

Although no specified textbooks were written for the Middle School Agriculture programme general agriculture textbooks used contain the necessary information on gestation period in sheep. However, the knowledge levels of the Middle School graduates indicate lack of knowledge in sheep breeding.

The low knowledge levels of Middle School leavers may be traced to Indigenous Knowledge among peasant farmers in the North Tongu District concerning gestation period in sheep and goats. Indigenous Knowledge has it that sheep and goats lamb or kindle after three months of conception. Since Middle School leavers rank higher home training as a factor influencing their entry into farming than JSS leavers, it is likely that the Indigenous Knowledge produces retroactive and proactive inhibition on the learning acquired at school and interferes with the retention of science-based knowledge. This finding supports the notion that learning that precedes new knowledge or supersedes new learning can interfere with retention of desired knowledge and promote forgetting of

new knowledge (Chaplin and Krawiec, 1974 ; Von Runkel,1986). The indigenous knowledge gets embedded in their Long -Term Memory and is manifested in the answers to the test item. The Indigenous Knowledge fails to teach that gestation period is calculated from date of service to day of lambing instead of the observable distension of the belly of an animal marking the start of gestation.

To further probe the knowledge levels of the young farmers, those who had the item correct and those who got it wrong are compared on the farming activities that involve the utilization of sheep and goat breeding knowledge covered by the study. Goat keeping activities are considered because the two animals have some commonalities in breeding. Sheep and goat keeping are the two major farming activities involving the use of sheep breeding knowledge.

Again, those who had the test item on sheep breeding correct are compared with those who did not get it right. The results are shown in Table 6.10.

Table 6.10: Percentage distribution of respondents who correctly scored test item by participation in sheep and goat keeping activities.

Test score Categories	% Respondents who keep either sheep or goats.	
	Sheep Keeping	Goat Keeping
Correct (N=44)	18.2	25.0
Wrong (N=76)	10.5	27.6

Source: The Study

From Table 6.10, majority of the young farmers who had the item correct keep sheep as against those who failed the test item on sheep breeding. They almost match each other in goat keeping. The Middle School and JSS leavers who got the item correct are

compared on the basis of their participation in sheep or goat keeping activities as done previously. The results are shown in Table 6.11.

Table 6.11: Percentage distribution of respondents who correctly score the item on sheep breeding by school and level of participation in sheep or goat keeping activities.

Test Score Categories	Sheep or goat keeping activities and % number of respondents	
	Sheep Keepers	Goat Keepers
MS Correct (N=8)	25.0	50.0
JSS Correct N=36)	16.7	19.4

Source: The Study

Table 6.11 indicates that only 16.7% of the JSS graduates who got the test item correct keep sheep and 19.4% keep goats while 25.0% of Middle School leavers are sheep keepers and 50.0 percent keep goats.

The superior performance of the JSS graduates is associated with the school they attended more than sheep or goat keeping. The finding suggests that the JSS leavers might have acquired the knowledge from school. It could be concluded that the Middle School leavers who correctly scored the test item might have achieved it out of goat and sheep keeping or through other learning experiences which have not been captured by the study.

6.7 Performance on pesticide test

Table 6.1 shows that both the Middle School and JSS graduates perform creditably on the items testing the concept of concentration in mixing pesticides and determination of Net farm Margin. While 88.5% and 95.0% of the Middle School leavers correctly score the two items respectively, lower percentages of 75.0% and 85.0% of the JSS score the

items correctly. The Middle School leavers demonstrate higher knowledge levels on the two test items.

To get an insight into the performance of the young farmers, they are placed into two test score categories, namely; correct and wrong categories. They are traced to determine the level of their involvement in pesticide usage activities.

The main pesticide usage activity covered by the study is application of pesticides. The performance determined by pesticide application is shown in Table 6.12.

Table 6.12: Distribution of respondents who correctly score the pesticide test by level of participation in pesticide application.

Test Score Categories	% Respondents who apply pesticides
Correct(N=98)	24.5
Wrong (N=22)	13.5

Source: The Study.

Table 6.12 shows that the respondents who correctly score the test item on pesticides participate in more pesticide application activities in farming than those who fail the test item. The implication is that those who score the item correctly may be rehearsing their knowledge for mixing pesticides and therefore are able to recall the answer while those who fail the test might have forgotten out of disuse of knowledge.

Further probe is made to trace any relationships that may exist between the knowledge levels of the young farmers on the pesticide test item and their involvement in the use of pesticides on the basis of type of school attended and gender as shown in Table 6.13.

Table 6.13: Percentage distribution of respondents who correctly scored the test item on pesticides by application of pesticides in farming and gender.

Respondents Categories	% number of respondents in pesticide application activities	
	Applying Pesticides	Hiring labour for spraying agro-chemicals
Middle Sch. Leavers	26.2	28.6
MSm (N=42)	9.1	18.2
MSw (N=11)	17.7	23.4
All MS (N=53)		
JSS leavers		
JSSm (N=34)	29.4	20.6
JSSw (N=11)	18.2	18.2
All JSS (N=45)	23.8	19.4

Source: The Study

From Table 6.13, on the average, Middle School leavers have a higher level of participation in pesticide application activities than JSS graduates. Middle School men who answer the pesticide test item correctly participate in pesticide application activities more than the other categories of respondents. The implication is that Middle School leavers participate more frequently in utilizing pesticides than the JSS graduates and hence their ability to answer the test item more than the JSS leavers. The least of the farming activities involving the application of pesticides for JSS men is hiring people to spray their farms. Agro-chemical spraying is one of the male roles in farming in the district and the young men do it by themselves.

In conclusion, the knowledge levels of the young farmers on the pesticide test item is influenced by school knowledge, their individual differences as well as application of pesticides and hiring of people to spray agro-chemicals, Each of the categories of farmers participate in the pesticide usage activities at different rates and their performance on the test item is affected in a similar manner. Perhaps the pesticide application activities enable them to rehearse, enact and reinforce their knowledge in

mixing pesticides resulting in their ability to remember and recall the knowledge in answering the question on pesticides. This supports the notion that activities that involve the use of an acquired knowledge strengthens the memory of the learner and the ability to recall that knowledge, (Van Dura quoted in McCreary ,1989).

6.8 Performance on net farm margin test.

The final test item is on determination of net farm margin. The main mathematical competence tested by the item is the ability to apply the principles underlying addition and subtraction of whole numbers in determining returns to investment in farming.

Respondents who score the test item correctly are traced to determine any links between their performance on the test and their participation in activities involved in using the knowledge and ability to calculate farm earnings. Since farm records provide information for determining farm income, the respondents were asked to indicate whether they kept farm records or not. The levels of participation of respondents who pass the test and those who fail are shown in Table 6.14

Table 6.14: Distribution of respondents who had the item correct and wrong by record keeping.

Test Score Respondent Category	% Record Keepers
Correct (N=108)	49.1
Wrong (N=12)	33.3

Source: The Study.

Table 6.14 shows that although there is low farm record keeping among the respondents in general, those who correctly scored the test, on the average kept farm

records more than those who failed the test. The finding implies that the knowledge and ability to calculate net farm margin per se is not the only determinant in assessing performance in farming in the study area. Indigenous systems of assessing performance in farming is widely practised in the district which greatly influences the practices of the young farmers (Asiegbor, 1980).

6.9 Summary

The performance of the Middle School and JSS graduates on the test shows that the knowledge retained by the two groups does not differ from each other. This applies to Middle School and JSS graduates as well as their males. There is however a significant difference between Middle School females and JSS females in their retained knowledge levels. With the exception of the test item on goat breeding, the differences observed in their performance on the individual test items are associated with a mis-match between school agricultural knowledge and knowledge required for farming and participation in farming activities involving the use of such knowledge more than the school they attended.

CHAPTER 7

FACTORS THAT INFLUENCE SCHOOL LEAVERS TO BECOME FARMERS

7.0 Introduction:

It is not clear at first sight why so many young boys and girls who ought to be in school engage in agricultural production as farmers. There may be compelling reasons why these young people enter into farming so early in life. Is the early entry into farming their own choice? Have they been compelled by circumstances beyond their control? What are their aims in farming?

The study finds out from the respondents their reasons for stopping schooling, the factors which influenced them to enter into farming at such early ages and their aims in farming.

7.1 Reasons for Terminating Schooling at an Early Age

The reasons given by Middle School and JSS graduates for discontinuing school in the North Tongu District include lack of funds, no guardian to sponsor schooling, no school to attend, failure in examination and other reasons (failure to take examinations, punishment at school, stopping school to learn a trade, teenage pregnancy and entry into cattle keeping. The reasons for terminating school given by the respondents are shown in Table 7.1.

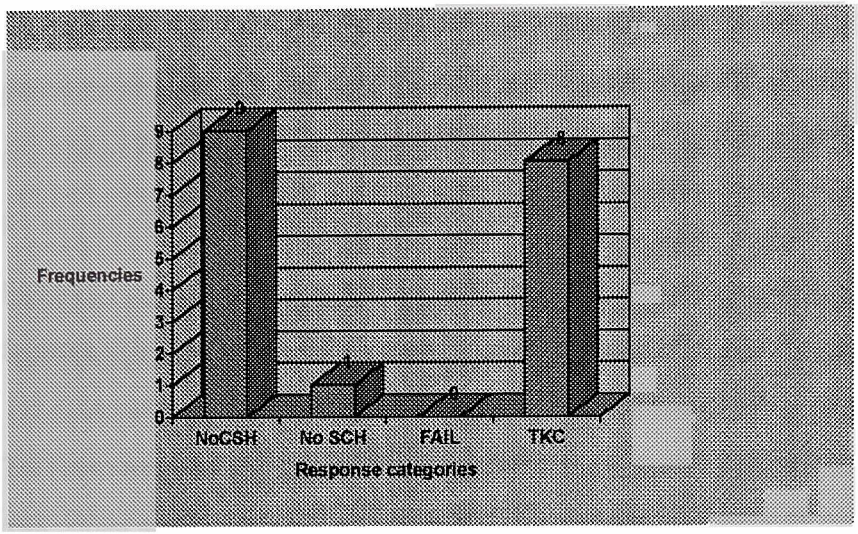
Table 7.1: Distribution of Middle School and JSS graduates by reasons for terminating schooling.

	% number of respondents and reasons for terminating schooling					
Respondents Categories	No Money / Guardian	No School	Fail Exams	Cattle Keeping	Punishment / Pregnancy	Learn Trade / Fail To take Exam
Middle Sch. Leavers						
MSm (N=48)	87.5	0.0	0.0	10.4	0.0	2.1
Msw (N=12)	83.3	0.0	0.0	0.0	8.3	9.4
All MS (N=60)	85.4	0.0	0.0	8.3	1.7	4.6
JSS leavers						
JSSm (N=39)	84.6	2.6	2.6	7.7	0.0	3.1
JSSw (N=21)	81.0	0.0	4.8	0.0	4.8	9.4
All JSS (N=60)	83.3	1.7	3.3	5.0	1.7	5.0

Source: The Study

Table 7.1 indicates that majority of all the respondents terminate schooling as a result of financial constraints. Both Middle School and JSS graduates almost equally terminate schooling as a result of lack of funding. This implies that a great number of the respondents wish to continue schooling if they have money or sponsorship.

The next most important reason for terminating schooling is cattle keeping. Observations from the district confirms that cattle keeping is a serious form of child labour which prevents boys from schooling. The study traces the background of that group of farmers and the results are shown in Figure 7.1.



LEGEND:

NoCSH = No cash, money or guardian. No SCH = No Secondary School to attend.

FAIL = Failed in Examination. TKC = To Keep Cattle

Figure 7.1: Bar chart of frequency distribution of Cattle Herders by reasons for terminating school.

Source: The Study.

The respondents who terminate schooling and keep cattle are almost evenly distributed on two main reasons namely; no money or guardian and interest to keep cattle. A minority of them do not get any school to attend. It implies that more than half of the number of the young cattle keepers will continue schooling if they have money or guardian to sponsor their schooling.

It can be inferred from the results that although cattle farming is an important occupation in the North Tongu District, young out-of school youth prefer to go for higher education and training other than getting into cattle production soon after leaving Basic School.

To sum up, lack of sponsorship, inability to get a school, teenage pregnancy, and punishment at school are important factors redirecting the Middle School and JSS graduates to undertake other activities instead of continued schooling. A minority portion of the respondents express self-interest in farming. The study therefore probes further to identify reasons which compel the school leavers to become farmers.

7.2 Respondents and factors influencing entry into farming

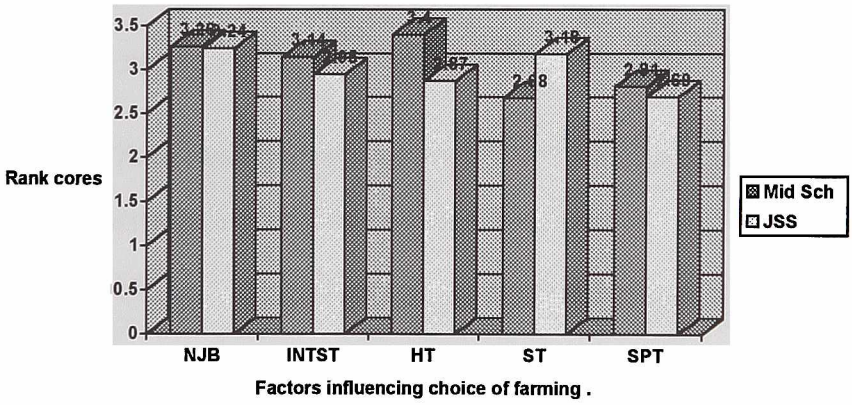
The study identifies factors which influenced the young people to finally select farming as an occupation. The young farmers were asked to rank five factors which encourage them to become farmers in the district. The factors include, no other job available, own interest, home training in farming, school training in farming and support of parents. The support of parents is in the form of land acquisition, initial capitalization of the farming enterprise, supply of seed and breeding stock. The mean rank scores for the given factors by all the respondents are presented in Table 7.2.

Table 7.2: Distribution of all the respondents by mean rank scores for factors influencing entry into farming.

Respondent Categories	Reasons and mean rank scores				
	No Job	Interest	Home Training	School Training	Support
MS (N=60)	3.26	3.14	3.40	2.68	2.81
JSS (N=60)	3.24	2.95	2.87	3.18	2.69
All Respondents (N=120)	3.25	3.05	3.14	2.93	2.75

Source: The Study

From Table 7.2, on the average, the most important factor which makes all the respondents enter into farming is the fact that they have no other alternative source of employment with a mean rank score of 3.25. The informal training they have at home in farming is the second important factor with a mean rank score of 3.14, followed by their own interest in farming, school training comes fourth, finally, the least factor is support of parents. The order of the ranking suggests that all the respondents prefer other jobs to farming and they have been compelled to take up farming in the North Tongu District. Informal training is the second factor indicated by the ranking score of the respondents for selecting farming as a career. The ranking of the factors based on type of school attended is shown in Figure 7.2.



LEGEND: NJB = No other Job Available INTST= Own Interest. HT =Home Training.
ST = School Training in farming. SPT = Support of Parents

Figure 7.1: Bar chart of distribution of Middle School and JSS leavers by mean rank scores of factors influencing them to become farmers.

Source: The Study

From Figure 7.2, the order of ranking the factors by the Middle School leavers in descending order is, 'home training' in farming, 'no job', 'interest', 'support' and 'school

training'. The JSS graduates however select farming by the influence of the following factors in descending order, 'no job', 'school training', 'interest', 'home training' and 'support'. Middle School graduates are much affected by the home-training. Since JSS graduates rank 'no job' as the most important factor, they show a higher level of preference for other jobs than Middle School leavers. It implies that the JSS graduates have been compelled to select farming as an alternative job in the district. Middle School leavers have a higher level of interest in farming and support than the JSS graduates. Since the Middle School graduates are older than the JSS leavers, with the expression of a higher level of interest, their parents may be more willing to provide them with support than the JSS graduates. The Middle School leavers appear to have more confidence to farm than the JSS leavers as indicated by their ranking of the factors influencing them to go into farming. This may be due to their age and the frustration of seeking for other jobs without success.

Table 7.3: Distribution of Middle School and JSS males and females by mean rank scores of factors influencing them to become farmers.

Respondent Categories	Reasons and mean rank scores for reasons				
	No Job	Interest	Home Training	School Training	Support
MS male (N=48)	3.52	2.85	3.31	2.52	2.70
Ms female (N=12)	3.00	2.42	3.50	2.83	2.92
JSS male (N=39)	2.62	3.79	2.87	3.08	2.51
JSS female (N=21)	3.86	2.10	2.86	3.29	2.86

Source: The Study.

Table 7.3 shows that Middle School males rank 'no job' highest among the factors while JSS males rank 'interest' highest. When JSS males rank 'school raining' second, Middle School males rank 'home training' second. The third factor for Middle School males is 'interest' while JSS males rank 'home training'. The fourth rank position is taken by 'support' for Middle School males and 'no job for JSS

males. While 'school training' takes the fifth position for Middle School males, their JSS counterparts place 'support'.

Considering the females, Middle School females place 'home training' at first position in rank while JSS females select 'no job'. JSS females rank 'school training' at second position while Middle School females place 'no job'. 'Support' and 'home training' are ranked at third position by JSS females but Middle School females pick support for the third position and 'school training' at fourth position. The two groups place 'interest' at the last position in rank among the factors for entering into farming in the district.

The rankings of the factors influencing the choice of farming show that JSS females are compelled to enter into farming more than Middle School leavers. However, the Middle School males have a higher level of compulsion than JSS males for entering into farming.

7.3 Levels of agreement on the ranking of factors influencing entry into farming

The levels of agreement or disagreement between the respondent categories in their ranking of the factors influencing selection of farming is determined by The Kendall Coefficient of Concordance (**W**) as shown in Table 7.4.

Table 7.4: The Kendall Coefficient of Concordance, **W,** among Middle School and JSS graduates on factors influencing selection of farming.

Respondents	R	$\Sigma(R_i-R_i)^2$	W	χ^2	P=.01	P=.05	Df (N-1)
MS (N=60)	3.05	0.369	0.0369	8.858	NS	NS	4
JSS (N=60)	2.99	0.2002	0.0200	4.8048	NS	NS	4
MS male (N=48).	2.98	0.7074	0.071	3.408	NS	NS	4
MS female N=12).	2.93	0.599	0.06	_	NS	NS	4
JSS Male (N=39)	2.97	1.1375	0.114	17.78	S	S	4
JSS Female(N=21)	2.99	1.6728	0.167	14.028	S	S	4

NS = Not significant S = Significant

Source: The Study.

Table 7.4 indicates that there is no significant level of agreement between the Middle School leavers and Junior Secondary School graduates on the criteria they use for ranking the factors influencing choice of farming in the North Tongu District. It implies that they have no common basis in ranking the factors. As individual human beings they may have different motives and aims which are not common to others in terms of career selection. Selection of farming as a career does not seem to depend on whether the learners pursue a practical or a comprehensive Basic School Agriculture programme.

On the basis of sex, there is no significant level of agreement between the Middle School males and Middle School females on the criteria they use for ranking the factors. This finding suggests that as individual human beings, they may be influenced by different factors for entering into farming which are not associated with the type of school they attended. It is possible that the study does not capture some

of the factors which compel them to be farmers or they fail to disclose them to the study.

Considering the Junior Secondary School males and females however, there is a significant level of agreement between them. The rankings of the factors by JSS graduates can be explained by considering the JSS education programme which is more broad-based than the Middle School programme. It offers 12 different externally examinable subjects including prevocational ones as against four externally examinable courses for the Middle School. The Junior Secondary School programme might have given the graduates more scope for training and hope for employment in other sectors of the economy than the Middle School programme. They may be aspiring for other jobs rather than farming hence their preference for other jobs.

Secondly, the JSS graduates left school more recently than the Middle School leavers and may have a higher school-based solidarity or 'we feeling' than Middle School leavers who may have lost school solidarity.

Again, the high ranking of 'no job' by the respondents in general can be looked at from the non competitive nature of the agricultural socio-economic environment. The low socio-economic status of farmers observed in the district leaves much to be desired. It is perhaps a major factor preventing young people from entering into farming in the first place. In such an environment, there are little incentives to induce young people to pick up farming as a career.

7.4 Ranking of aims in farming

In the process of selecting farming as an occupation, the respondents are influenced by five factors at different levels. It may be interesting to determine how the differences between them and the various motives and drives they express for selecting farming, relate to their aims in raising crops and animals in the district.

The study asked the respondents to rank four main aims for farming. The aims are family food security, cash income, prestige and other aims (supplementary food, supplementary income and pleasure). The ranking scores for the aims for farming on the basis of type of school attended and the mean ranking for all the respondents are shown in Table 7.5.

Table 7.5: Distribution of Middle School and JSS graduates by ranking of aims for farming.

Respondent Categories	Aims for farming and rank scores			
	Food	Income	Prestige	Others
MS (N=60)	3.30	3.28	1.86	1.22
JSS (N=60)	3.22	3.54	2.35	1.81
All Respondents (N=120)	3.26	3.41	2.11	1.52

Source: The Study.

Table 7.5 shows that 'income' is the aim ranked highest by all the respondents, followed by food, prestige and other aims. Middle School leavers, in descending order rank family food security their highest priority aim followed by cash income, prestige and finally supplementary food, income or pleasure the least important. JSS graduates on the other hand, rank cash income their highest aim, family food

security second, prestige third and supplementary food, income or pleasure the least priority aim for farming. Comparing the rankings of prestige and supplementary food or income or pleasure by the two groups, JSS leavers rank the two type of aims higher than Middle School graduates. The ranking of the Middle School leavers appears to suggest that they are not commercially oriented as the JSS graduates since they focus on family food production more than the JSS graduates.

In the hierarchy of needs, food occupies the first priority in the essential needs of man (Swaminathan, 1992). It implies that other human needs under consideration in this chapter occupy higher levels in the hierarchy. Since Middle School leavers rank food as their top priority it is indicative of the fact that they are behaving as peasant farmers (Johnson,1990) while JSS graduates show orientation towards commercial farming.

This finding implies that Middle School leavers being older and married, may be raising families. They may be concerned with raising food to keep their families and therefore accord it the highest priority in their objectives for farming as opposed to JSS graduates. Most of the JSS leavers are single and do not have children to feed.

Examining the issue on the basis of type of school attended and gender a different scenario is portrayed as shown in Table 7.6.

Table 7.6: Distribution of respondents by mean rank scores of aims for farming and gender.

Respondent Categories	Aims for farming and rank scores			
	Food	Income	Prestige	Others
Middle Sch leavers				
MSm (N=48)	2.70	3.30	2.00	1.24
MSw (N=12)	3.55	3.20	1.52	1.25
JSS leavers				
JSSm (N=39)	2.98	3.48	2.20	2.49
JSSw (N=21)	3.46	3.56	2.48	1.08

Source: The Study

Table 7.6 shows that Middle school males and JSS males rank 'income' in the first position and 'food' second. They alternate the third and fourth positions with 'prestige' and 'others' or supplementary aims in farming. Middle school females give 'food' the highest rank score while their JSS counterparts rank 'income' at the first position. The latter also rank 'income' higher than the former. JSS females rank 'prestige' higher than Middle School females while the latter also rank other aims in farming more than the former.

The ranking of aims for farming by the respondents shows similarities in their ranking on the basis of type of school attended. However, variations are observed on the rankings based on gender. It is evident from the rankings that differences in type of school attended cannot fully explain the observations on the rankings. The study therefore uses other differences among the respondents especially age for explaining the observations. The ranking of the aims in farming on the basis of age is presented in Table 7.7.

Table 7.7: Distribution of respondents by age and mean ranking of aims for farming.

Age Categories	Aims for farming and rank scores			
	Food	Income	Prestige	Others
Less 18 years	3.00	3.71	1.86	1.29
18-24 years	3.27	3.41	2.15	1.27
25-30 years	3.33	3.45	2.03	1.55
Above 30 years	3.63	3.19	1.94	1.25

Source: The Study

Table 7.7 indicates that the oldest farmer respondents rank family food production their highest priority aim for farming in the North Tongu District. There is an inverse relationship between the ranking of the objective of family food production with age. The older the farmer, the higher the rank score for family food security.

Compared to the ranking of family food security, the reverse trend of ranking is shown for cash income. The youngest persons among the farmer respondents rank cash income the highest priority aim for farming in the North Tongu District. Generally, the younger the farmer, the higher the rank score for cash income. The ranking of family food security and cash income by the respondents tend to suggest that the farmers change their aims in farming as they grow older.

Besides the differences in the ranking of food and cash income, there is a general decrease in the importance of the other two aims as one moves from cash income towards supplementary aims for farming.

7.5 Levels of agreement between the respondents on aims in farming.

Having examined the ranking of the aims for farming, which shows differences in importance attached by the various groups of respondents, the study finds out whether there is a common basis in ranking the aims for farming by the respondent categories. The levels of agreement or disagreement between the respondent categories in the way they rank the aims for farming is determined by calculating the Kendall Coefficient of Concordance (**W),** for all the respondent categories as shown in Table 7.8.

Table 7.8: The Kendall Coefficient of Concordance, **W**, showing levels of agreement between respondent categories on aims in farming.

Respondents	R	$\Sigma (R_i-R)^2$	W	χ^2 N≥ 20	α =.05	α = .01	df
Mid School (N=60)	2.41	3.267	0.871	156.78 S	7.82 S	11.34 S	3
JSS (N=60)	2.73	1.887	0.503	90. 54 S	7.82 S	11. 34 S	3
Mid Sch. Male (N=48)	2.34	1.634	0.327	47. 088 S	7.82 S	11. 34 S	3
Mid. Sch. Female(N=12)	2.48	4.3748	0.875	_	. 359 S	. 250 S	3
JSS Male (N=39)	2.81	0.976	0.195	22. 841 S	7.82 S	11. 34 S	3
JSS Female (N=21)	2.65	3.886	0.777	63.78 S	7.82 S	11. 34 S	3

S = Significant

Source: The Study

From Table 7.8, the Kendall Coefficient of Concordance (**W**), values are significant for all the respondent categories at (.05) and (.01) probability levels. This is

indicative of the fact that the rankings of aims for farming by the respondents are not at random or unrelated but that they use similar criteria for ranking their aims for farming. Although there is a high level of agreement or concordance between them, however, the levels of the agreements vary as shown by the different values of the Kendall Coefficient of Concordance recorded for each of the groups.

Middle School leavers show a higher level of agreement between themselves on their aims for farming than the Junior Secondary School graduates. It suggests that the type of school they attended influence them in their ranking. It can also imply that their age is the factor influencing their ranking. Since the Middle School leavers and JSS graduates vary in age and marital status, it is possible that these differences may influence the criteria they apply for ranking the aims for farming.

Comparing the values of the Kendall Coefficient of Concordance of the respondent categories on the basis of gender, the Middle School females show the greatest level of agreement between themselves, followed by Junior Secondary School females.

1.6 Summary

The chapter reveals that majority of the respondents terminate school because they do not have money to continue schooling. However, there is a group who terminate schooling to keep cattle. In all, there is an indication that if majority of the respondents are able to get sponsorship they will prefer going for further education and training than to enter into farming in the district.

JSS graduates show the highest level of preference for other jobs than the Middle School leavers. On the basis of gender, the JSS females indicate a greater preference for other jobs than Middle School females. In effect, they have been compelled to choose farming as a career. However, JSS males show the greatest interest for entering into farming.

Middle School leavers are influenced more by the informal agricultural education than JSS graduates. Similarly, JSS leavers indicate a higher influence from the formal agricultural education they have for entering into farming than Middle School graduates.

The respondent categories rank the factors influencing choice of farming in the North Tongu District at random because no significant level of agreement exists between Middle School leavers, JSS graduates, Middle School males and females in the ranking. It is shown that the JSS males and females have significant levels of agreement in ranking the factors for choosing farming in the district.

The rankings of the aims for farming by the respondents indicate that Middle School leavers show a higher priority for family food security while JSS graduates are more commercial in their priorities. On gender, Middle School females rank family food security first priority but JSS females rank income.

The Kendall Coefficient of Concordance, **W**, indicates significant levels of agreements between all the respondent categories. The type of Basic School Agriculture pursued cannot fully explain the aims in farming but age because it is

shown that as the farmer respondents grow older their aims in farming change from income to family food security.

CHAPTER 8

BASIC SCHOOL LEAVERS IN FORMAL AGRICULTURAL KNOWLEDGE UTILISATION FOR FARMING

8.0 Introduction

The study traces the background of the Middle School leavers and Junior Secondary School graduates farming in the North Tongu District and determines some of the differences that exist between them. The main differences identified between the JSS and Middle School leavers include type of Basic Agriculture pursued, age, gender, marital status, use of school-based agricultural knowledge in home farming while in school, factors influencing the choice of farming and aims in farming.

This chapter determines and discusses how these differences between the Middle School and Junior Secondary School graduates affect their farming practices and their achievements in farming. The discussion focuses on factors in new knowledge utilisation setting, new knowledge utilisation in: general farming practices; crop production practices, animal keeping practices and achievements from farming.

8.1 Background farming information of Respondents

The new agricultural knowledge utilisation factors discussed in this part of the report consists of the background farming information of the respondents. It includes part time farming, type of farm products produced, farm ownership systems, land ownership and level of investment in improved farming inputs.

8.1.1 Full-Time and Part-Time Farming

The composition of respondents in terms of full time and part time farming is assessed in the study as shown in Table 8.1.

Table 8.1: Percentage distribution of respondents by full time and part time farming.

Respondents	% number of Middle School and JSS leavers in full time and part time farming.	
	Full Time	Part Time
MS (N=60)	61.7	38.3
JSS (N=60)	68.3	31.7
All respondents (N=120)	65.0	35.0
MS Male (N=48)	68.8	31.2
MS Female (N=12)	33.3	66.7
JSS Male (N=39)	76.9	23.1
JSS Female (N=21)	52.4	47.6

Source: The Study.

Table 8.1 shows that on the average, majority of the respondents (65.0%) are in full time farming. More of the JSS graduates operate as full time farmers than Middle School leavers while the latter do part time farming more than the former. JSS males are in full time farming more than Middle School males. A higher proportion of Middle School females (66.7%) are in part-time farming than all the other groups of respondents.

Some of the regular occupations of part-time farmers include tailoring, driving, masonry, hair dressing, dressmaking and carpentry. Respondents in part-time farming have regular jobs which occupy their time and concentration. Paying attention to such jobs may influence their farming practices and achievements.

In all, the females engage in part-time activities more than the males. One major part-time activity of the females is agro-processing. It was observed that almost all the females undertake agro-processing. Some of the products include gari, cassava

dough, palm oil, kernel oil and local cheese (wagazi). But these agro-processing activities are not fully covered by the JSS syllabus.

8.1.2 Respondents and type of agricultural products

The types of agricultural products produced are used to identify the type of farmers they are. The respondents were asked to indicate the kinds of products they produced. The results are presented in Table 8.2.

Table 8.2: Percentage distribution of respondents by type of products produced.

Respondents	% number of respondents and farmer types	
	Crops Only	Crops and Animals
MS (N=60)	31.7	68.3
JSS (N=60)	25.0	75.0
All respondents	28.4	71.7
MS Male (N=48)	29.2	70.8
MS Female (N=12)	41.7	58.3
JSS Male (N=39)	12.8	87.2
JSS Female (N=21)	47.6	52.4

Source: The Study.

From Table 8.2, majority (71.7%) of the respondents are mixed farmers. Junior Secondary School graduates (75.0%) are involved in mixed farming more than Middle School leavers (68.3%) while the latter do crop farming more than the former. More Middle School Females are involved in animal production than JSS females. Generally, the young farmers are involved in raising animals more than crops. This finding supports the estimates of Psalm Consult (1996) that 87 percent of the farmers in the North Tongu District engage in animal raising.

It was observed that almost all the females involved in one form of agro-processing or the other. The products they dealt with include gari, cassava dough, palm oil, kernel oil,

coconut oil and local cheese (wagazi). But the processing of these products are not covered by the JSS Agriculture syllabus.

8.1.3 Respondents and farm ownership

The study determines the type of farm enterprise ownership systems within which the young farmer respondents operate. The respondents were asked to indicate whether they farm on their own or in partnership. The answers given by the respondents are shown in Table 8.3.

Table 8.3: Percentage distribution of respondents by type of farm ownership

Respondents	% number of respondents by type of farm ownershi system....	
	Sole Ownership	Partnership
MS (N=60)	98.3	1.7
JSS (N=60)	93.3	6.7
All respondents	97.2	4.2
MS. male (N=48)	100.0	0.0
MS. female (12)	91.7	8.3
JSS male (N=39)	97.4	2.6
JSS female (N=21)	85.7	14.3

Source: The Study.

Table 8.3 indicates that majority (97.2%) of all the respondents are sole farm owners. On the average, only 4.2 percent of all the respondents are in partnership system. Junior Secondary School graduates are in partnership ownership system more than Middle School leavers.

8.1.4 Land ownership

The respondents were asked to indicate the type of land ownership system they operate. They were also to rate the level of difficulty they experience in obtaining land for farming in the district. The responses are shown in Tables 8.4 and 8.5.

Table 8.4: Percentage distribution of respondents by land ownership status.

Respondents	% number of respondents by type of land ownership status			
	Own-self	Own-Family	Hire	Communal
MS (N=60)	3.3	13.3	33.4	50.0
JSS (N=60))	3.3	18.3	31.7	46.7
All respondents (N=120)	3.3	15.8	32.5	48.4
MS Male (N=48)	4.2	14.6	37.5	43.8
MS Female (N=12)	0.0	8.3	16.7	75.0
JSS Male (N=39)	2.6	15.4	30.8	51.3
JSS Female (N=21)	4.8	23.3	33.3	38.1

Source: The Study.

From Table 8.4, the mean land ownership status of the respondents indicates that majority (48.4%) of them belong to the communal system of land ownership in the North Tongu District. Almost a third of the young farmers hire land on which they farm. Quite a substantial number too work on land owned by their families. Middle School leavers work more on communal land than JSS graduates who in turn hire land more than the former.

8.1.5 Difficulty in land Acquisition

The levels of difficulty experienced by the young farmers in obtaining land for farming is shown in Table 8.5.

Table 8.5: Percentage distribution of Middle School and JSS graduates by their perceived difficulty in land acquisition for farming.

Respondents	% number of respondents by land acquisition difficulty levels		
	Difficult	Somewhat Difficult	Easy
MS (N=60)	35.0	3.3	61.7
JSS (N=60)	43.3	3.3	53.4
All respondents	39.2	3.3	57.5
MS Male (N=48)	35.4	4.2	60.4
MS Female (N=12)	33.3	0.0	66.7
JSS Male (N=39)	38.5	5.1	56.4
JSS Female (N=21)	52.4	0.0	47.6

Source: The Study.

Table 8.5 indicates that on the average, majority (57.5%) of the respondents do not perceive much difficulty in obtaining land in the North Tongu District for farming particularly Middle School leavers. But the JSS graduates have quite a high level of difficulty in securing land for farming. Both JSS and Middle School Females have the highest level of difficulty in land acquisition while JSS Males experience the least level of difficulty in getting land to farm in the District.

8.1.6 Investment in improved farming inputs

The study determines farm investment practices of the young farmers. The respondents were asked to indicate the type and amounts of investments they usually made on improved farming inputs namely tractor service, improved seeds, fertilizers and veterinary products. The results are presented in Table 8.6.

Table 8.6: Distribution of respondents by type and costs of investment in improved farming inputs.

Respondents	Mean Amount invested in respective improved farming inputs (¢)				
	Tractor Service	Improved Seed	Fertilizer	Vet. Products	MeanTotals
MS (N=60)	64,367.00	4,033.00	16,583.00	42,333.00	31,892.00
JSS (N=60)	66,367.00	4,516.00	12,733.00	23,250.00	26,725.00
All respondents	65,385.00	4,274.00	14658.00	32,791.00	26,725.00
MS. Male (N=48)	109,458.00	5,042.00	17,917.00	50,104.00	45,630.00
MS Female (N=12)	53,167.00	0.00	11,250.00	11,250.00	18,917.00
JSS Male (N=39)	83,359.00	4,949.00	14,846.00	34,338.00	34,373.00
JSS Female (N=21)	21,000.00	333.00	8,333.00	2,286.00	7,988.00

Source: The Study.

Table 8.6 indicates that Middle School leavers are higher investors than JSS graduates. Middle School males invest more than JSS males. The least investors are JSS females.

8.2 General farming practices

The general farming practices considered by the study include, farm enterprise planning, post harvest treatment, record keeping and use of other sources of agricultural information.

8.2.1 Respondents and farm enterprise planning

Planning is an important practice in every business operation and farming is no exception. The study assesses the farm enterprise planning practices of the respondents. They were asked to indicate whether they perform various farm enterprise planning activities as shown in Table 8.7.

Table 8.7: Percentage distribution of Middle School and JSS leavers by farm planning activities

Respondents	% number of respondents in respective Farm Planning Activities.....				
	Planning	Writing Plans	Setting Objectives	Time Tabling	Sub-Mean Total
MS (N=60)	98.3	31.7	91.7	58.3	70.0
JSS (N=60)	98.3	28.3	88.3	41.7	64.2
All respondents(N=120)	98.3	30.0	90.0	50.0	67.1
MS Male (N=48)	100.0	33.3	93.3	54.2	70.3
MS Female (N=12)	91.7	25.0	83.3	75.0	68.8
JSS Male (N=39)	100.0	43.6	92.3	43.6	69.9
JSS Female (N=21)	95.2	0.0	81.0	38.1	53.6

Source: The Study.

In all, the sub-mean total participation of Middle School and JSS graduates in farm enterprise planning is 60.3 percent as shown in Table 8.7. The better farm planners are Middle School leavers as compared to JSS graduates. Considering the other respondent categories, the order of better farm enterprise planners is Middle School males, JSS males, Middle School females and finally JSS females. JSS females plan their farming activities in their heads because they do not write down the plans.

8.2.2 Use of other sources of information

The farmer respondents were asked to indicate the sources of new information they use in their farming activities by selecting from the list provided. The results are shown in Table 8.8.

Table 8.8: Percentage distribution of respondents by use of other sources of information.

Respondents	% Number of respondents using other sources of agricultural information.....				
	Extension Visit	Friends	Radio	Printed Mat..	Sub-Mean Totals
MS (N=60)	55.0	78.3	5.0	16.7	38.8
JSS (N=60)	26.7	90.0	1.7	8.3	31.8
All respondents	40.9	84.2	3.3	12.5	35.3
MS Male (N-48)	60.4	72.9	6.3	20.8	40.1
MS Female (N=12)	33.3	100.0	0.0	0.0	33.3
JSS male (N=39)	30.8	84.6	2.6	12.8	32.7
JSS female(N=21)	19.0	100.0	0.0	0.0	29.8

Source: The Study

The sub-mean totals from Table 8.8 show a low level of utilization of agricultural information from other sources by the farmer respondents. Middle School leavers use other sources of information more than JSS graduates. Middle School males use more information from other sources than their own knowledge followed by their female counterparts. JSS males are third while their female counterparts place fourth in utilizing agricultural information from other sources.

The performances of the farmer respondent categories suggest that they depend mostly on their own knowledge in farming. But the practice varies from one farmer group to another. The JSS graduates appear to be more independent than the Middle School leavers in that regard.

8.2.3 Farm record keeping

The study investigates the farm record keeping practices of the respondents as shown in Table 8.9.

Table 8.9: Percentage distribution of respondents by farm record keeping and reasons for keeping.

Respondents	% Farm Record Keepers and reasons for not keeping records.....				
	Keepers	Not Useful	Wastes Time	Laziness	Not Understand
MS (N=60)	41.7	40.0	2.9	37.1	20.0
JSS (N=60)	53.3	24.1	3.4	69.0	3.4
All respondents(N=120)	47.5	31.9	3.2	53.1	11.7
MS Male (N=48)	50.0	25.0	4.2	50.0	20.8
MS Female (N-12)	8.3	72.7	0.0	9.1	18.2
JSS male (N=39)	64.1	20.0	6.7	66.7	6.7
JSS female (N=21)	33.3	28.4	0.0	71.4	0.0

Reasons for not keeping records was determined only for respondents who did not keep records.
Source: The Study

Table 8.9 shows that the young farmer respondents do not keep farm records much since the percentage participation in record keeping is 47.5. However, JSS graduates keep farm records more than Middle School leavers. JSS males place first followed by Middle School males while JSS and Middle School females are third and fourth respectively.

8.2.4 Reasons for not keeping records

The young farmer respondents who do not keep records express different reasons for not doing so. The reasons include: 'farm record keeping is not useful', 'it wastes time', 'lazy in keeping records' and, 'does not understand'. On the average, 31.9 percent of all the respondents consider record keeping not useful. However, Middle School leavers hold a higher opinion on it than JSS graduates. JSS graduates said record keeping wastes their time more than Middle School leavers. On the whole, only Middle School

males and JSS males said it is a waste of time. Laziness is the major factor in preventing the all respondents from keeping farm records. JSS graduates cite this factor more than Middle School leavers. On average, lack of knowledge in farm record keeping is the third factor that prevents 11.7 percent of the respondents from practising the activity. However, Middle School leavers are affected by lack of knowledge more than JSS graduates.

8.2.5 Knowledge utilization in general farming practices

The general farming practices assessed for the farmers include planning, use of other sources of agricultural information and farm record keeping. The mean percentage Knowledge Utilization in general farming practices is determined by adding up all the sub-mean percentage totals of participation in the listed practices and dividing by the number of practices involved. The results are shown in Table 8.10.

Table 8.10: Distribution of respondent categories by percentage sub-mean and mean total utilization of knowledge in general farming practices.

Respondents Sub-mean and mean totals of respondents in respective general farming practices.....

	Planning	Other information sources	Record Keeping	Mean Utilization
MS (N=60)	70.0	38.8	41.7	50.2
JSS (N=60)	64.2	31.8	53.3	49.8
All respondents(N=120)	67.1	35.3	47.5	50.0
MS male (N=48)	70.3	40.1	50.0	53.5
MS female (N=12)	68.8	33.3	8.3	36.8
JSS male (N=39)	69.9	32.7	64.1	55.6
JSS female (N=21)	53.6	29.8	33.3	38.9

Source: The Study

Table 8.10 shows that 50.0 percent of all the farmer respondents on the average utilize new agricultural knowledge in general farming activities. However, Middle School leavers use new agricultural knowledge a little more than JSS graduates.

8.3 Crop production practices

The crop production practices considered by the study include crop selection, land testing, farm tool usage, cropping system selection, seed selection, planting methods, cropping patterns and yield measurement.

8.3.1 Crops cultivated

The survey identifies the types of crops cultivated by the farmer respondents. They were asked to indicate the crops they cultivate. The results are shown in Table 8.11.

Table 8.11: Percentage distribution of respondents by crops cultivated.

Respondents	% number of respondents and respective crops				
	Vegetables	Cereals	Roots&Tubers	Legumes	Sub-Mean Total
MS (N=60)	12.7	86.7	85.0	19.2	50.9
JSS (N=60)	15.6	88.3	88.3	27.5	54.9
All respondents (N=120)	14.2	87.5	86.7	23.4	52.9
MS Male (N=48)	14.1	83.3	81.3	18.8	49.4
MS female (N=12)	6.7	100.0	100.0	20.9	56.4
JSS male (N=39)	17.4	92.3	87.2	28.2	56.3
JSS female (N=21)	12.4	80.9	90.5	26.2	52.5

Source: The Study.

The mean total participation of all the respondents in crop cultivation as shown in Table 8.11 is 53.0 percent. It is an indication that the respondents do not participate much in the production of crops listed. However, JSS graduates produce the listed crops more than Middle School leavers.

On the whole, Middle School females lead the other respondents in crop production than the other respondent categories. JSS males are second followed by JSS females and finally Middle School males.

8.3.2 Land testing practices

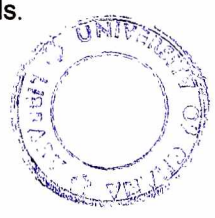
Since every type of crop may not grow well on every soil, farmers develop practices for testing the suitability of farmlands for crop cultivation. The respondents were asked to indicate whether they tested their farmlands or not. They were also to indicate whether they perform the following land testing practices: determination of soil texture and organic matter content, matching plants growing on the land to fertility status of land and determination of soil nutrients. The results are shown in Table 8.12.

Table 8.12: Percentage distribution of respondents by land testing practices.

Respondents	% number of respondents in respective land testing activities					
	Testers	Texture	Organic Matter	Match Plants	Nutrients	Sub-Mean Totals
MS (N=60)	90.0	90.0	88.3	68.3	0.0	67.3
JSS (N=60)	83.3	81.7	81.7	81.7	0.0	65.7
All respondents (N=120)	86.7	85.9	85.0	75.0	0.0	66.5
MS male (N=48)	95.8	97.9	95.8	81.3	0.0	74.2
MS female (N=12)	66.7	58.3	66.7	16.7	0.0	41.7
JSS male (N=39)	87.2	84.6	84.6	84.6	0.0	68.2
JSS female (N=21)	76.2	76.2	76.2	76.2	0.0	61.0

Source: The Study.

The sub-mean total participation in land testing by all the respondents is 66.5% as shown in Table 8.12. Middle School leavers are better land testers than JSS graduates. In all, the descending order of good land testers is Middle School males, JSS males, JSS females and Middle School females although they vary in the level of participation in specific indigenous land testing practices. None of the respondents determines the nutrients in the soil of their farmlands.



8.3.3 Use of farm tools

The study assesses the types of farm tools used by the farmers in the district. The types of tools are classified into indigenous and non indigenous farm tools. The respondents and of tools used is shown in Table 8.13.

Table 8.13: Percentage respondent categories in type of farm tools usage

Farming Task	Percentage respondent categories in type of farm tools usage			
	Middle School (N=60)		JSS (N=60)	
	Indigenous	Non Indigenous	Indigenous	Non Indigenous
Bush Clearing	1000.0	0.0	100.0	0.0
Tree Felling	100.0	0.0	100.0	0.0
Stumping	100.0	0.0	100.0	0.0
Soil Digging	100.0	0.0	100.0	0.0
Raised Beds	100.0	0.0	100.0	0.0
Ridging	98.3	1.7	100.0	0.0
Mound Preparation	100.0	0.0	100.0	0.0
Weeding	100.0	0.0	100.0	0.0

Source: The Study

Table 8.13 shows that indigenous tools are the types used by both JSS and Middle School leavers in the North Tongu District for farming. It suggests that the use of non indigenous tools for teaching Basic School Agriculture does not influence the use of the same.

8.3.4 Cropping patterns

Cropping patterns is used here to refer to the number of types of crop species occupying a farmland at a time. The respondents were asked to indicate the type of

cropping patterns they adopted for the cultivation of crops in their farms and give reasons for adopting them. The results are shown in Table 8.14.

Table 8.14: Percentage distribution of respondents by cropping patterns.

Respondents	% number of respondents and respective cropping patterns	
	Monocropping	Mixed Cropping
MS (N=60)	58.3	71.7
JSS (N=60)	55.0	76.7
All respondents (N=120)	56.7	74.2
MS male (N=48)	66.7	68.8
MS female (N=12)	25.0	83.3
JSS male (N=39)	59.0	71.8
JSS female (N=21)	47.0	85.7

NB: Some of the respondents use both monocropping and mixed cropping.
Source: The Study

On the average, more than half the number of all the farmer respondents practise monocropping. Middle School leavers monocrop more than JSS graduates. The descending order of monocroppers is Middle School males, JSS females, JSS males and Middle School females.

Table 8.14 shows that a higher proportion of the respondents practise mixed cropping than monocropping. JSS graduates practise mixed cropping more than Middle School leavers. In all, JSS females top in mixed cropping followed by Middle School females, JSS males and finally Middle School males.

8.3.5 Reasons for practising mixed cropping

The reasons for mixed cropping as outlined by the respondents include prevention of crop failure, saving costs on land preparation, lack of land and compatibility of crop mixtures. The percentage distribution of respondents by reasons for mixed cropping is shown in Table 8.15.

Table 8.15: Percentage distribution of respondents by reasons for practising mixed cropping.

Respondents	% number of respondents in respective reasons for mixed cropping			
	Crop Failure	Save Cost	Lack of Land	Compatibility
MS (N=60)	15.0	43.3	8.3	6.7
JSS (N=60)	25.0	38.3	8.3	3.3
All respondents (N=120)	20.0	40.8	8.3	5.0
MS male (N=48)	14.6	37.5	8.3	8.3
MS female (N = 12)	8.3	50.0	8.3	16.7
JSS male (N=39)	28.2	33.3	2.5	5.0
JSS female (N=21)	19.0	47.6	19.0	0.0

NB: Totals do not add to 100 because some of the respondents did not practise mixed cropping and therefore did not give reasons.

Source: The Study.

Table 8.15 indicates that majority of all the respondents practise mixed cropping as a means of saving costs on land preparation and to prevent total crop failure. A minority practise it for lack of land and compatibility of the crops grown in the mixtures. More JSS females cite prevention of crop failure as their major reason for practising mixed cropping than the other respondent categories while cost saving is of greatest priority to Middle School females, followed by JSS women, then Middle School men and JSS males. Lack of land is a more important reason for JSS females practising mixed cropping than the other respondent categories.

Prevention of total crop failure and cost saving on land preparation are two risk minimizing techniques in crop cultivation (Sibylle 1991). On the basis of risk management, JSS graduates are more sensitive to risk management practices than Middle School leavers. Middle School females manage risks better than all the other respondent categories followed by JSS females while the males lag behind. This finding supports that of Johnson (1990) and Sibylle (1991) that resource poor small-scale farmers tend to apply risk management techniques at the expense of profit

maximising practices in their farming operations particularly when this is compared to their ranking of aims in farming.

8.3.6 Sources of seed

A farmer's persistent use of improved seeds depends on the availability of such seeds and the value he or she attaches to the concept of seed technology. The study identifies sources of planting materials used by the farmer respondents. The results are shown in Table 8.16.

Table 8.16: Percentage distribution of respondents by sources of seed for planting.

Respondents	% of respondents in respective sources of seed supply.....			
	Own Farm	Friends	Local Market	Seed Dealers
MS (N=60)	80.0	1.7	5.0	11.7
JSS (N=60)	73.3	3.3	8.3	15.0
All respondents (N=120)	76.7	2.5	6.7	13.4
MS male (N=48)	75.0	2.1	6.3	14.6
MS female (N=12)	100.0	0.0	0.0	0.0
JSS male (N=39)	71.8	2.6	7.7	17.9
JSS female (N=21)	76.2	4.8	9.5	9.5

Source: The Study.

Table 8.16 shows that majority of all the respondents obtain planting materials from their own farms and only a minority procure it form accredited seed dealers. JSS graduates procure seeds from accredited sources than Middle School leavers. A farmer's value for planting seeds from accredited sources depends on the understanding he or she has in Seed Science. Understanding the genetic basis of seeds would increase the chances of procuring seeds from accredited sources for planting while lack of knowledge would probably produce the opposite.

8.3.7 Row and Haphazard planting

Since majority of the farmer respondent groups cultivate cassava and maize, row and haphazard planting methods for the two crops are used for analysis as shown in Table 8.17.

Table 8.17: Percentage distribution of respondents by cassava and maize planting methods.

Respondents	% respondents in respective casava and maize planting methods				
	CASSAVA		MAIZE		
	Row	Haphazard	Row	Haphazard	Mean Row Total
MS (N=60)	58.3	26.7	80.0	5.0	69.2
JSS (N=60)	63.3	25.0	83.3	5.0	73.3
All respondents (N=120)	60.0	25.9	81.7	5.0	71.3
MS male N=48)	60.4	20.8	81.3	5.0	70.9
MS female(N=12)	50.0	50.0	75.0	25.0	62.5
JSS male (N=39)	71.8	15.4	89.7	2.6	80.8
JSS female (N=21)	47.6	42.9	71.4	9.5	59.3

NB: *Totals do not add to 100 because some of the farmers did not cultivate cassava nor maize*
Source: The Study.

The mean total row planting for cassava and maize is shown in Table 8.17 Since haphazard planting method is an indigenous practice acquired from home more than school, and row planting is learnt at school as new knowledge, the assessment of the performance of the young farmer respondents is based on mean total row planting for the two crops used for the analysis.

The practice of row planting of maize and cassava among the respondents is quite high (71.3%). However, JSS graduates practise row planting more than Middle School leavers. In all, the descending order of high row planting is JSS males, Middle School males, Middle School females and JSS females respectively.

8.3.8 Crop Output Optimisation practices

The study assesses the farming practices the farmers use to increase crop yields on their farms. They were asked to rank seven practices for optimising crop outputs. The practices include row planting, fertilizer application, use of supernatural powers, pest and disease control, planting improved varieties, weed control and increase of farm size. The results of the ranking are shown in Table 8.18.

Table 8.18: Distribution of respondents by rank scores for crop output optimisation practices.

Respondents	Rank Scores for crop output optimisation practices						
	Row	Fertilizer	S. Powers	Pest/Diz.	Varieties	Weeds	Farm Size
MS (N=60)	5.43	3.93	4.05	3.45	3.03	6.25	1.85
JSS (N=60)	6.23	3.55	4.33	3.13	3.47	5.88	1.47
All respondents (N=120)	5.83	3.74	4.19	3.29	3.25	6.07	1.66
M S. Male (N=48)	5.42	3.94	4.04	3.46	3.02	6.07	1.96
MS. Female (N=12)	5.40	3.92	4.08	3.42	2.50	6.58	1.42
JSS male (N=39)	6.26	3.44	4.28	3.28	3.62	5.69	1.64
JSS female (N=21)	6.24	3.76	4.43	2.67	3.19	6.19	1.14

Source: The Study.

From Table 8.18, the descending order of ranking crop yield optimising practices by all the respondents is weeding, row planting, use of supernatural powers, fertilizer application, pest and disease control, planting improved varieties and increase in farm size. The ranking of supernatural powers suggests that the farmers have a high level of belief in supernatural interventions in increasing outputs from farming.

While JSS graduates rank row planting as the first practice, Middle School leavers give weeding the first position. Again, JSS graduates place weeding second, Middle School leavers place row planting second. Both groups rank supernatural powers third and fertilizer application fourth. However, the fifth yield optimising practice for the JSS is

improved varieties while that of Middle School leavers is pest and disease control. But the two groups interchange the sixth position with the two practices; pest and disease control for JSS and improved varieties for Middle School leavers. Although both groups rank farm size seventh, the rank score of Middle School leavers is greater than that of JSS.

The ranking pattern of the two groups shows that JSS graduates give higher values to row planting and improved crop varieties while Middle School leavers give the two practices lower values.

With the exception of fertilizer application and improved varieties, Middle School males and JSS males rank the practices in a similar manner. While Middle School males place improved varieties at sixth position, JSS males put it at fourth place in the rank. JSS females place row planting first but Middle School females rank weeding at first position. The pattern of ranking of the factors by female respondents is similar to that of males. The major difference between them is the ranking of row planting, use of improved varieties and pest and disease control. JSS females rank row planting first while Middle School females rank it second. Improved crop varieties is fifth for JSS while Middle School females place it sixth.

To test for their levels of agreement in ranking yield optimisation practices, the Kendall Coefficient of Concordance is calculated for all the farmer respondents as shown in Table 8.19.

Table 8.19: Distribution of respondent categories by The Kendall Coefficient of Concordance for ranking of yield optimising practices.

Respondents	The Kendall Coefficient of Concordance for yield optimisation practices of farmers						
	R	$\Sigma(R_i - R)^2$	W	χ^2, if N ≥ 20	P =.05	P = .01	Df =N-1 (7-1)
MS (N=60)	4.00	12.9807	0.464	167.04	S	S	6
JSS (N=60)	4.00	16.2574	0.581	209.16	S	S	6
MS male (N=48)	3.99	11.7271	0.419	120.672	S	S	6
MS female N=12)	3.90	16.5880	0.592	-	S	S	6
JSS male (N=39)	4.03	14.5785	0.521	121.914	S	S	6
JSS female (N=21)	3.95	20.6403	0.737	92.862	S	S	6

S = Significant.
Source: The Study

Table 8.19 shows that there are significant differences between all the respondent categories in their ranking of practices for optimising crop yields from their farms. This means that the various farmer groups apply similar criteria in ranking these factors.

Referring to Table 8.18, Middle School leavers ranked the yield optimisation practices in a different way from the ranking of JSS graduates. Similarly, Middle School males differ in their ranking from that of JSS males. In a similar manner, Middle School females differ from JSS females in the ranking of the yield optimisation practices.

From Table 8.17, it is noted that JSS leavers plant crops in rows more than Middle school leavers. A similar pattern is observed for both male and female respondent groups in the study. Again, Table 8.16 also shows that JSS leavers buy improved seeds more than Middle School leavers.

The investment patterns of Middle School and JSS leavers provide more support to the consistency of the ranking of yield optimisation practices. Middle school graduates invest more in fertilizers than JSS leavers while the later also invest more in improved seed than Middle School leavers. A similar scenario is observed for male and female farmers in the study.

From the above presentations, it is shown that the type of school attended by the JSS and Middle School leavers influence them in ranking these factors.

It appears that the JSS programme makes the graduates develop higher value for row planting and planting of improved varieties than the Middle School programme hence the difference between the two groups in their rankings. Again, row planting and planting of improved varieties are farming practices with observable merits only after harvesting. Farmers with deeper knowledge about their advantages are more likely to consider them as a higher priority in planning their activities. The JSS graduates therefore demonstrate possession of higher values for farming practices which have abstract merits.

The patterns of ranking of the Middle School and JSS leavers suggest that graduates from an academic-vocational Basic Agricultural Education programme place higher value on yield maximising practices that are abstract with no immediately observable advantages while those from a practical programme place higher value on practices with immediately observable advantages.

The performance of the other categories of respondents is explained by similar arguments.

The performance of the JSS graduates supports the findings of Eisemon and Nyamete (1988) that Basic School Agriculture should make farmers understand modern agricultural technologies, incorporating them into agricultural production practices, incorporating modern agricultural technologies into existing indigenous knowledge system of the farmer and use of school science knowledge and numeracy skills in the performance of tasks in farming.

8.3.9 Storage practices

The respondents were asked to indicate whether they store their farm produce, and the type of storage technology applied. Two types of storage technologies applied by the respondents are indigenous or non indigenous. Cribs and Barns are indigenous storage technologies while sack is a non indigenous technology taught in school.

The distribution of the respondents by storage of farm produce and non indigenous storage technology (sack) usage is shown in Table 8.20.

Table 8.20: Percentage distribution of respondents by storage of farm produce and non indigenous storage technology (sack).

Respondent	% number of respondents storing produce and in sack storage technology		
	Storers	Sacks	Mean Total
MS(N=54)	86.7	53.7	70.2
JSS (N=48)	80.0	62.5	71.3
All respondents (N=120)	83.3	58.1	70.8
MS male (N=43)	87.5	53.5	70.1
MS female (N=11)	83.3	45.5	64.4
JSS male (N=32)	82.1	34.4	58.3
JSS female (N=16)	76.2	43.8	60.0

Source: The Study.

Table 8.20 indicates that majority (83.3%) of all the respondents store the produce from their farms but only 58.1% use sacks. However, Middle School leavers store farm produce more than JSS graduates but they almost match the latter in using sacks for storage. Middle School males store produce more than JSS males and also in using sacks. Middle School females follow their men counterparts in storing but JSS females lead them in using sacks.

8.3.10 Reasons for storing farm produce

The reasons for storing farm produce listed by the respondents include storing produce for: higher prices, food security, preventing waste of produce and use of product during periods of scarcity.

8.3.11 Mean knowledge utilization in crop production practices

The crop production activities assessed by the study include crop selection, land testing, farm tool usage, selection of seed sources, row spacing and storage. The mean knowledge utilization in crop production activities is shown in Table 8.21.

Table 8.21: Distribution of respondents by percentage mean new knowledge Utilization in crop production.

Respondents	Respondents in respective sub-mean total crop production practices and mean knowledge utilization.								
	Crop Selection	Land Testing	Farm Tool usage	Seed Source	Row Planting	Storage	Mono cro-pping	Mixed-Cropping	Mean Kn. Utilization
M.S (N=60)	50.9	67.3	1.7	11.7	69.2	70.2	58.3	71.7	50.1
JSS (N=60)	54.9	65.7	0.0	15.0	73.3	71.3	55.0	76.7	51.5
All respondents	52.9	66.5	0.8	13.4	71.3	70.8	56.7	74.2	50.8
M.S. Male (N=48)	49.4	74.2	2.1	14.6	70.9	70.1	66.7	68.8	52.1
M.S. Female (N=12)	56.4	41.7	0.0	0.0	62.5	64.4	25.0	83.3	41.7
JSS Male (N=39)	56.3	68.2	0.0	17.9	80.8	58.3	59.0	71.8	51.5
JSS.Female (N=21)	52.5	61.0	0.0	9.5	59.3	60.0	47.0	85.7	46.9

Source: The Study

From Table 8.21, the mean new knowledge utilization in crop production by all the respondents is 50.8 percent. However, JSS graduates have a little edge over Middle School leavers in utilizing more new agricultural knowledge in crop production. On the whole, Middle School males utilize more new knowledge in crop production than all the respondent categories, followed by, JSS males, JSS females and the least is Middle School females in that order.

8.4 Animal production practices

Having compared the levels of participation of the Middle School and Junior Secondary School graduates in crop production practices, this aspect of the presentation deals with animal production activities. Since all the respondents do

not keep animals, the analysis depends mainly on the number of animal keepers in each respondent category. Also, more than half of the number of respondents in each category participate in animal raising in the study area. The young farmer respondents are compared on the following animal production practices: type of animals kept, stock size, systems of housing animals and level of participation and dependency in animal production activities.

8.4.1 Animals keeping and housing systems

The young farmers were asked to indicate the type of animals they keep. The percentage of respondents keeping various animals are determined and the mean calculated by adding the respective percentages and dividing by the number of animal types for all the groups of animals kept. In poultry for instance, chicken, ducks, guinea fowls and pigeons are the types kept by the farmer respondents. The total percentage for the respective types of birds are divided by four (4), the number of poultry types kept. None of the respondents keep turkeys nor ostrich which is recently introduced into the North Tongu District.

The Non Traditional animals kept by the respondents are grasscutter, guinea pigs and bees. None of the respondents keep rabbits. In the determination of stock size, one beehive is considered as one animal unit.

In determining stock size of animals per head per respondent category, the number of animals in each animal group is added and divided by the number of animal keepers in each respondent category. The stock size figures are calculated to the nearest whole

number to make them meaningful. The mean totals show the percentage number of the respondents keeping animals as shown in Table 8.22.

Table 8.22: Percentage distribution of respondents by animal keeping and types

Respondents	% animal keepers by respective animal types						
	Keepers	Cattle	Sheep /Goats	Poultry	Pig	Non Tradi.	Sub-Mean Total
MS (N=60)	68.3	22.5	22.3	22.4	10.0	1.3	24.5
JSS (N=60)	75.0	15.5	21.1	30.5	0.0	1.7	24.0
All respondents (N=86)	71.7	19.0	21.5	26.5	5.0	1.5	24.2
MS male (N=48)	70.8	26.5	25.0	22.7	11.8	1.5	26.4
MS female (N=12)	58.3	0.0	23.6	21.3	0.0	0.0	17.2
JSS male (N=39)	87.2	17.6	23.6	29.4	0.0	2.2	26.7
JSS female (N=21)	52.4	0.0	13.7	34.1	0.0	0.0	16.7

Source: The Study

Table 8.22 indicates that majority of the farmer respondents keep animals. Junior Secondary School graduates participate in animal keeping more than Middle School leavers. JSS males keep animals more than Middle School males. Middle School females also keep animals more than JSS females.

8.4.2 Types of animals and stock size

The study assesses the animal stock size of the respondents by dividing the number of animal-type kept by each respondent category by the number of respondents in that category as shown in Table 8.23.

Table 8.23: Distribution of respondents by animal stock size.

Respondents	number of animals per head per respondent category					
	Cattle	Sheep/Goats	Poultry	Pig	Non Trad.	Mean Total
MS (N=41)	15	3	4	1	1	6
JSS (N=45)	3	3	6	0	1	3
All respondents (N=86)	9	3	5	1	1	5
MS Male (N=34)	18	8	6	1	1	9
MS Female (N=7)	0	1	2	0	0	1
JSS Male (N=34)	4	4	7	0	1	4
JSS Female (N=11)	0	3	2	0	0	1

Source: The Study

Table 8.23 indicates that each respondent category keeps at least two poultry. Thus poultry is the most popular farm animal kept by all the young farmers. The keeping of sheep and goats is the second in terms of groups of young farmers involved in it. More Middle School leavers rear sheep and goats than JSS graduates. Cattle keeping is the third important farm animal reared by all the respondents because female respondents do not keep it. The high cattle stock size is probably due to the fact that cattle keepers keep other people's animals in addition to their own. Additionally, some of the cattle farmers said they acquired animals through inheritance from their departed parents.

Middle School leavers involve more in cattle keeping than JSS graduates. Women respondents do not keep cattle. The non participation of females in cattle keeping is in agreement with gender roles in animal rearing in the District. Cattle keeping is a male dominated job although females own cattle, they are not keepers themselves. Pig keeping is the fourth in importance.

Finally, the farmer respondents rear three non traditional animals; namely: grasscutter, guinea pigs and bees.

8.4.3 Mean total animal per head.

Table 8.23 indicates that the average number of animals per head of all the respondents is five. Middle School leavers have a higher number of animal per head than JSS graduates. Middle School males are second with nine, followed by JSS males with four while Middle School and JSS females tie at the last place with one each.

8.4.4 Animal housing

Free Range and the Semi-Intensive system of housing in farm animals are the major housing practices of the respondents as shown in Table 8.24.

Table 8.24: Percentage distribution of respondents by semi-intensive animal housing system.

Respondents	% respondents in semi-intensive animal housing system					
	Cattle	Sheep/Goats	Poultry	Pig	Non Tradi.	Sub-Mean Totals
Middle School (N=41)	100.0	13.1	1.1	0.0	100.0	42.8
JSS (N=45)	100.0	19.6	5.0	-	100.0	56.2
All respondents (N=86)	100.0	16.4	3.1	0.0	100.0	43.9
Mid.Sch. male(N=34)	100.0	14.2	2.2	0.0	100.0	43.2
Mid Sch. Female(N=7)	-	22.2	0.0			11.1
JSS male (N=34)	100.0	1 2.5	6.3		100.0	54.7
JSS female (N=11)		41.6	0.0			20.8

NB: The dashes (-) show that the respective respondent category do not keep such animals and therefore do not house them.

Source: The Study

From Table 8.24, the mean totals show that the semi-intensive system of housing animals is practised by less than half the number of all the respondents (43.9%). However, the practice of the housing system varies from one group of respondents to another as well as from one animal type and the other.

The 'Kraal' type of housing cattle is widely practised in the district. This appears to be a consequence of cattle rattling in the district, a factor which compels cattle keepers to form Cattle Farmers Association in the Volta Region (VRCFA, 1990). The farmers said they guard their kraals in the night against cattle thieves. Sheep and goats are second to cattle and non traditional animals in semi-intensive housing units. JSS graduates apply the semi-intensive housing system for sheep and goats more than Middle School leavers. Poultry is poorly housed by all the farmer respondents. JSS graduates

practise better housing for poultry than Middle School leavers. Pigs are poorly housed by their respective keepers namely; Middle School males. All the non-traditional farm animal keepers restrict their animals within reasonable limits under the semi-intensive system.

The pattern of animal housing among the farmer respondents suggests that the semi-intensive system of housing is applied for animals with high value and those with low level of domestication while the free range practice is applied for animals considered to be of little value and prestige. Cattle, sheep and goats, the large animals with high prices and prestige are better housed than poultry. Non Traditional animals some of which are not properly domesticated, such as the grasscuter are kept under the semi-intensive system of housing.

8.5 New knowledge utilization in animal keeping practices

Among the animal keeping practices considered by the study include general animal keeping practices, animal handling and safety, animal breeding and animal health management practices. The practices have been further broken down into tasks for detailed analysis. Thus, a number of tasks constitute a practice. New knowledge utilization of the farmer respondents in animal production is assessed by three response choices, namely; 'I do not do it', 'I do it with the help of other persons' and finally, 'I do it by myself'. While the first response category is meant to measure the level of non-participation of farmer respondents in animal production activities, the third response category constitutes the farmers' level of dependency in animal production activities and willingness to learn from other people. The third

response category however, measures the actual level of utilization of new knowledge of the farmers in animal keeping practices.

The level of utilization of new knowledge in animal production activities and dependency levels for all the respondent categories are shown in Tables 8.25, 8.26, 8.27 and 8.28.

8.5.1 General animal keeping practices

The general animal keeping practices considered by the study include identification of animals, animal pen construction, feed preparation and milking. The levels of participation in general animal keeping practices are shown in Table 8.25.

Table 8.25: Percentage distribution of respondents by level of utilization of new knowledge and dependency levels in general animal production activities.

Respondents % respondents in respective general animal production tasks and dependency levels

	Identification	Pen Construction	Feed Preparation	Milking	Sub-Mean Total
MS (N=41)	41.5	34.1	14.6	24.4	28.7
	(0.0)	(4.9)	(2.4)	(0.0)	(1.8)
JSS (N=45)	35.6	22.2	15.6	13.3	21.7
	(0.0)	(2.2)	(0.0)	(0.0)	(0.6)
All respondents (N=86)	38.6	28.2	15.1	18.9	25.2
	(0.0)	(3.5)	(1.2)	(0.0)	(1.2)
MS male(N=34)	50.0	41.2	17.6	29.4	34.6
	(0.0)	(2.9)	(2.9)	(0.0)	(1.5)
MS Female (N=7)	0.0	0.0	0.0	0.0	0.0
	(0.0)	(42.9)	(0.0)	(0.0)	(10.3)
JSS male (N=34)	41.2	26.5	14.7	14.7	24.3
	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
JSS female (N=11)	18.2	9.1	18.2	9.1	13.7
	(0.0)	(9.1)	(0.0)	(0.0)	(2.3)

Percentage dependency levels are shown below the levels of competencies in parenthesis
Source: The Study.

Table 8.25 shows that the respondent categories differ slightly in performing the tasks in general animal production practices. However, the sub-mean total level of utilization of new knowledge in general animal production activities is 25.2% with a dependency level of 1.2%. The level of utilization of new knowledge in animal production practices by

Middle School leavers (28.7%) is higher than that of JSS graduates (21.7%). Their levels of dependency are 1.8% and 0.6% respectively. Middle School males participate more in general animal production activities than JSS males. Similarly, the former depend on other persons more than the latter.

Both Middle School females and JSS females do not participate in general animal production activities. However, the two groups have dependency levels of 10.3% and 2.3% respectively.

8.5.2 Animal handling and safety practices

The tasks considered in animal handling and safety practices include restraining, dehorning, disbudding and hoof trimming as shown in Table 8.26.

Table 8.26: Percentage distribution of respondents by level of utilization of new knowledge in animal handling tasks.

Respondents	% respondents in respective animal handling tasks and dependency levels				
	Restraining	Dehorning	Disbudding	Hoof Trim.	Sub-Mean Total
MS (N=41)	100.0	24.4	2.4	17.1	36.0
	(0.0)	(0.0)	(2.4)	(4.9)	(1.8)
JSS (N=45)	100.0	15.6	2.2	11.1	32.2
	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
All respondents (N=86)	100.0	20.0	2.3	14.1	34.1
	(0.0)	(0.0)	(1.2)	(2.4)	(0.6)
MS Male (N=34)	100.0	29.4	2.9	20.6	38.2
	(0.0)	(0.0)	(2.9)	(5.9)	(2.2)
MS female (N=7)	100.0	0.0	0.0	0.0	25.0
	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
JSS male (N=34)	100.0	17.6	2.6	11.8	33.0
	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
JSS female (N=11)	100.0	9.1	0.0	0.0	27.3
	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)

Source: The Study *NB: Percentages of dependency levels are shown in parenthesis*

Table 8.26 shows that the level of utilization of new knowledge of all the respondents in animal handling tasks vary from task to task. But the sub-mean total participation in animal handling activities by all the respondents is 34.1% with a

dependency of 0.6%. Middle School leavers participate and depend on other people in animal handling activities more than JSS graduates. Similarly, Middle School males participate and depend on other people in animal handling activities more than their JSS counterparts. However, JSS females participate more than their Middle School counterparts in animal handling activities. Both groups do not depend on other people in handling animals. This may be due to the fact that in the North Tongu District, females do not normally keep large ruminants like cattle which sometimes require assistance from other people in handling.

8.5.3 Animal breeding practices

The animal breeding tasks considered by the study include separation of male and female animals in housing, developing a breeding programme, assisting animals with difficulty in giving birth and castration. The level of utilization of new knowledge in animal breeding activities and dependency are shown in Table 8.27.

Table 8.27: Percentage distribution of respondents by participation in animal breeding activities.

Respondents % respondents in respective animal breeding tasks and dependency levels

	Separating Sexes	Breeding Programme	Assisting Parturition	Castration	Sub-Mean Total
MS (N=41)	0.0	0.0	22.2	31.7	13.5
	(0.0)	(0.0)	(0.0)	(19.5)	(4.9)
JSS (N=45)	0.0	0.0	8.9	17.8	6.7
	(0.0)	(0.0)	(0.0)	(20.0)	(5.0)
All respondents (N=86)	0.0	0.0	15.6	24.8	10.1
	(0.0)	(0.0)	(0.0)	(19.8)	(5.0)
MS Male (N=34)	0.0	0.0	26.5	38.2	16.2
	(0.0)	(0.0)	(0.0)	(17.6)	(4.4)
MS Female (N=7)	0.0	0.0	0.0	0.0	0.0
	(0.0)	(0.0)	(0.0	(28.6)	(7.2)
JSS male (34)	0.0	0.0	8.8	17.6	6.6
	(0.0)	(0.0)	(0.0)	(20.6)	(5.2)
JSS female(N=11)	0.0	0.0	8.3	0.0	2.1
	(0.0)	(0.0)	(0.0)	(33.4)	(8.3)

Source: The Study. *NB: Percentages for dependency levels are shown in parenthesis*

Table 8.27 shows that the respondents house male and female animals in the same pen and do not draw breeding programmes. The sub-mean total level of utilization of new knowledge in animal breeding activities by all the respondents is 10.1% with a dependency of 5.0%. Middle School leavers participate more than JSS graduates in animal breeding activities. Similarly, Middle School males participate more than JSS males. However, JSS females participate in animal breeding activities than their Middle School counterparts.

8.5.4 Animal health management practices

The tasks discussed under animal health management include developing a medication schedule, vaccination, controlling ectoparasites, controlling endoparasites and treatment of injuries. The level of utilization of new knowledge by all the respondents in animal health management activities is shown in Table 8.28.

Table 8.28: Percentage distribution of respondents by participation in animal health management practices.

Respondents	% respondents in respective animal health management tasks and dependency levels					
	Medic. Schedule	Vaccination	Ectopara.	Endop.	Injuries	Sub-Mean Total
MS (N=41)	7.3	12.2	90.2	26.8	100.0	47.3
	(24.4)	(68.3)	(0.0)	(24.4)	(0.0)	(23.4)
JSS (N=45)	11.1	15.6	93.3	20.0	87.0	45.4
	(6.7)	(51.1)	(0.0)	(15.6)	(2.2)	(15.1)
All respondents (N=86)	9.2	13.9	91.8	23.4	93.5	46.4
	(15.6)	(59.7)	(0.0)	(20.0)	(1.1)	(19.3)
MS Male (N=34)	8.8	14.7	91.2	26.5	100.0	48.2
	(23.5)	(73.5)	(0.0)	(29.4)	(0.0)	(25.3)
MS Female (N=7)	0.0	0.0	100.0	0.0	100.0	40.0
	(28.6)	(42.9)	(0.0)	(28.6)	(0.0)	(20.0)
JSS male (N=34)	14.7	14.7	100.0	23.5	91.2	48.8
	(5.9)	(52,9)	(0.0)	(20.0)	(0.0)	(15.8)
JSS female (N=11)	0.0	18.2	72.7	9.1	81.8	36.4
	(9.1)	(45.5)	(0.0)	(0.0)	(8.3)	(12.6)

Source: The Study. *NB: Percentages for dependency are shown in parenthesis*

Table 8.28 shows that all the respondent categories participate in the six animal health management tasks. The sub-mean total level of new knowledge utilization by all the respondents in animal production practices is 46.4% with a dependency level of 19.3%. Middle School leavers participate and depend on other persons more than JSS leavers. Middle School males participate in 48.2% of the tasks while their JSS counterparts do so at 48.8%. However, JSS males do not depend on other people as Middle School males. Middle School females participate in 40.0% of the health management activities while their JSS counterparts do so at 36.4%. The two groups have dependency levels of 20.0% and 12.6% respectively.

8.5.5 Mean total knowledge utilization in animal keeping

The mean total knowledge utilization in animal keeping practices is determined by adding up the percentage sub-mean totals for the four animal production practices discussed and dividing it by four. A similar treatment is given the dependency levels to obtain the percentage mean total dependency levels as shown in Table 8.29.

Table 8.29: Percentage distribution of respondents by mean total knowledge utilization in animal keeping practices and dependency levels.

Respondents % Sub-mean total knowledge utilization and dependency levels in animal keeping

	Sub-mean Knowledge utilization	Dependency
MS (N=41)	31.4	8.0
JSS (N=45)	26.5	5.2
All respondents (N=120)	29.0	6.5
MS male (N=34)	34.3	8.4
MS female (N=7)	16.3	9.4
JSS male (N=34)	28.2	5.2
JSS female (N=11)	19.9	5.8

Source: The Study

Table 8.29 indicates a low level of knowledge utilization of all the farmer respondents at 29.0 percent in animal keeping practices with a dependency level of 6.5 percent. However, Middle School leavers participate and utilize new knowledge in animal keeping activities than JSS graduates. They are also more dependent on other persons for performing animal keeping tasks more than the JSS leavers. Middle School males use more new knowledge in animal keeping than JSS males. JSS females also use more new knowledge in animal keeping than Middle School females. On dependency, however, Middle School males are more dependent on other people than JSS leavers. JSS females are less dependent on other people than Middle School females.

Inferring from Tables 8.6, 8.23 and 8.29, high levels of farm animal possession associate positively with high levels of investment in veterinary products and higher levels of new knowledge utilization in animal keeping practices. Middle School leavers have a greater number of animals per head, investment more in veterinary products and utilize new knowledge in animal rearing than JSS leavers. Similarly Middle School males portray the same scenario as compared to JSS males. However, performance of the females is not explained by similar factors.

On dependency, an academic-vocational Basic School Agriculture associates with a higher level of independence. JSS graduates tend to be less dependent on other people in rearing animals though they do not use new knowledge as much as Middle School leavers.

The pattern of dependency in performing animal keeping tasks suggests that the theoretical-practical Basic Agricultural Education give the JSS graduates confidence to be more independent in animal production than their counterparts.

8.6 Mean total new knowledge utilization in animal production activities

The performance of the farmer respondents in the animal production practices is the mean of the sub-mean totals of their involvement in animal keeping, animal housing and participation in animal keeping practices as presented in Table 8.30.

Table 8.30: Percentage distribution of respondents by sub-mean and mean total new knowledge utilization in animal production.

Respondents % sub-mean and mean total knowledge utilization in respective animal production practices.....

	Involvement	Housing	Keeping	Mean Utilization
M. S. (N=60)	24.5	42.8	31.4	32.9
JSS (N=60)	24.0	56.2	26.5	35.6
All respondents (N=86)	24.3	49.5	29.0	32.4
M.S.male (48)	26.4	43.2	34.3	34.6
M. S. female (N=12)	17.2	11.1	16.3	14.9
JSS male (N39)	26.7	54.7	28.2	36.5
JSS female (N=21)	16.7	20.8	19.9	19.1

Source: The Study

From Table 8.30, the mean utilization of new knowledge in animal keeping is at a low of 32.4 percent for all the farmer respondents. However, JSS graduates have an edge over Middle School leavers. JSS and Middle School males are low users. JSS and Middle School females are very low users at 19.1 and 14.9 percent respectively. Compared to general farming practices and crop production, utilization of new knowledge in animal keeping is the least.

8.7 Differences in knowledge utilization in farming

The study compares the levels of new knowledge utilization of the farmer respondents in general farming practices, crop production practices and animal production activities as shown in Table 8.31.

Table 8.31: Percentage distribution of respondents by Mean and Grand mean total knowledge utilization in general farming, crop production and animal production practices.

Respondents	% mean totals in general farming, crop production and animal production practices; and grand mean total in farming activities			
	Mean general farming	Mean crop production	Mean animal production practices	Grand mean total knowledge utilization in farming activities.
MS (N=60)	50.2	50.1	32.9	44.4
JSS (N=60)	49.8	51.1	35.6	45.5
All respondents (N=120)	50.0	50.6	34.3	45.0
MS male (N=48)	53.5	52.1	34.6	46.7
MS female (N=12)	36.8	41.7	14.9	31.1
JSS male (N=39)	55.6	51.5	36.5	47.9
JSS female (N=21)	38.9	46.9	19.1	35.0

Source: The Study

Table 8.31 shows that the various respondent categories do not vary from each other in using new knowledge in general farming activities, crop production practices and animal production activities. Besides, the grand mean total level of new knowledge utilization in farming by all the respondents is 45.0%. With the exception of JSS males at a high of 47.9% and JSS females and Middle School females at 35.0% and 31.1% respectively, the rest of the respondent categories do not vary far from the grand mean total of 45.0%.

This implies that the farmers utilize more Indigenous Technical Knowledge (ITK) at 55.0% as compared to formal knowledge at 45.0%.

The Wilcoxon-Mann-Whitney Test is used to assess the differences in knowledge utilization in general farming activities, crop production and animal rearing as shown in Tables 8.32, 8.33 and 8.34.

Table 8.32: Difference in new knowledge utilization levels in farming between Middle School and JSS leavers as measured by Wilcoxon-Mann-Whitney Test.

Level of knowledge utilization	32.9	35.6	49.8	50.1	50.2	51.1
Categories of respondents	MS	JSS	JSS	MS	MS	JSS
Rank	1	2	3	4	5	6
W_{JSS} = 2+3+6 = 11						
W_{MS} = 1+4+5 = 10						
$H_O = P[W_{JSS} > W_{MS}] = 1/2$, But, $P[W_{JSS} > 10] = .5000$ where, n=3, m=3.						

LEGEND:W_{JSS} = Sum of ranks for JSS graduates W_{MS} = Sum of ranks for Middle School leavers

Source: The Study

Table 8.32 shows that no significant difference exists between Middle School leavers and JSS graduates in utiizing new knowledge for farming in the North Tongu District. JSS graduates do not use more new knowledge for farming than Middle School leavers. The difference in new knowledge utilization between JSS males and Middle School males is shown in Table 8.33.

Table 8.33: Difference in new knowledge utilization levels in farming between Middle School males and JSS males as measured by Wilcoxon-Mann-Whitney Test.

Level of knowledge utilization	34.6	36.5	51.5	52.1	53.5	55.6
Categories of respondents	MSm	JSSm	JSSm	MSm	MSm	JSSm
Rank	1	2	3	4	5	6
W_{JSSm} =2+3+6 = 11						
W_{MSm} = 1+4+5 = 10						
$H_O = P[W_{JSSm} > W_{MSm}] = 1/2$, But, $P[_{JSSm} > 9] = .5000$ where, n=3, m=3						

LEGEND:W_{JSSM} = Sum of ranks for JSS Males W_{MSM} = Sum of ranks for Middle School males

Source: The Study

Table 8.33 indicates that no significant level of difference exists between Middle School males and JSS males in utilizing new knowledge for farming in the North Tongu District. JSS males do not use more new knowledge in farming than Middle

School males. The difference in new knowledge between Middle School females and JSS females is shown in Table 8.34.

Table 8.34: Difference in new knowledge utilization levels in farming between Middle School females and JSS females as measured by Wilcoxon-Mann-Whitney Test.

Level of knowledge utilization	14.9	19.1	36.8	38.9	41.7	46.9
Categories of respondents	MSf	JSSf	MSf	JSSf	MSf	JSSf
Rank	1	2	3	4	5	6
W_{JSSf} =2+4+6 = 12						
W_{MSf} = 1+3+5 = 9						
$H_O = P [W_{JSSf} > W_{MSf}] = 1/2$,	But, $P[_{JSSf} > 9] = .8000$ where, n=3, m=3					

LEGEND:W_{JSSF} = Sum of ranks for JSS Females W_{MSF} = Sum of ranks for Middle School Females

Source: The Study

Table 8.34 indicates that a significant level of difference exists between Middle School females and JSS females in utilizing new knowledge for farming in the North Tongu District. JSS females use more new knowledge in farming than Middle School females.

The findings on the differences in new knowledge utilization suggest that an academic-vocational Basic School Agriculture programme does not necessarily make the graduates use more new knowledge for farming than graduates from a practical programme. However, the converse is true in the case of JSS females as compared to the performance of Middle School females.

Besides the factors that impede new knowledge utilization for farming already discussed, one factor which relates to the pattern of new knowledge utilization by the respondent categories are the gaps between the contents of the JSS and Middle School Agriculture programmes and knowledge and skill requirements for farming in the North Tongu District. The contents of the Basic School Agriculture programmes

do not include some of the knowledge and skills required for farming in the district. In addition, the process of implementing the Basic School Agriculture programme might have affected the repertoire of agricultural knowledge acquired by the graduates.

If the school leavers do not have a particular new knowledge they cannot manifest it in their farming practices. The third factor to explain the low knowledge utilization in farming is lack of support for the young farmers as indicated by the District Director of Agriculture. Support in the form of credit can encourage the farmers to purchase improved farming inputs like fertilizers and improved seeds and other planting materials. The application of these inputs for instance will compel them to use new knowledge for farming.

8.8 Achievements from farming

One of the premises of the study is that achievements follow knowledge utilization in farming. Achievements in farming are discussed at two main levels in the report namely: tangible and intangible achievements in farming. Tangible achievements in farming comprise indicators of success in farming. The intangible achievements in farming refer to the perceived level of security in life from farming. The respondents were asked to indicate whether they have been successful in farming or not over the last couple of years. They were also asked to state the indicators of their success in farming. The results are presented in Table 8.35.

Table 8.35: Percentage distribution of respondents by tangible achievements from farming.

Respondents % Number of farmer respondents in respective indicators of success in farming.....

	High Output	Food Security	Cash Income	Properties
MS (N=60)	89.6	88.9	58.3	28.3
JSS (N=60)	91.7	91.7	46.7	35.0
All respondents (N=120)	90.7	90.7	52.5	31.7
MS Male (N=48)	89.6	89.6	60.4	29.2
MS Female (N=12)	91.7	91.7	50.0	25.0
JSS Male (N=39)	94.9	94.9	58.9	46.2
JSS Female (N=21)	95.2	95.2	52.4	14.3

Source: The Study

Table 8.35 shows that the farmers vary in the levels of achievements in farming. They vary in achieving farm output, food security, cash income and property acquisition. The levels of achievements decrease generally from food security to cash income and to acquisition of properties. This suggests that they consume part of their harvests and cash achievements decline as one moves towards acquisition of properties. The JSS females are most affected since their level of property acquisition is 14.3%.

8.8.1 Differences in Achievements from farming

The achievement levels of the respondents are compared using the Wilcoxon-Mann-Whitney Test as shown in Tables 8.36, 8.37 and 8.38.

Table 8.36: Differences in achievements between Middle School and JSS graduates from farming as measured by The Wilcoxon-Mann-Whitney Test.

Levels of achievements from farming	28.3	35.0	46.7	58.3	88.9	89.6	91.7	91.7
Categories of respondents	MS	JSS	JSS	MS	MS	MS	JSS	JSS
Rank	1	2	3	4	5	6	7	7
W_{JSS} = 2+3+7+7 =19								
W_{MS} = 1+4+5+6=16								
H_o = P [$W_{JSS} > W_{MS}$] = 1/2 But, P[W_{JSS} >16] = **.7571** where, n=4, m=4								

LEGEND:W_{JSS} = Sum of ranks for JSS graduates W_{MS} = Sum of ranks for Middle School leavers

Source: The Study

Table 8.36 shows a significant difference exists in the achievements from farming between Middle School leavers and JSS graduates. JSS graduates attain more tangible achievements in farming than Middle School leavers. The difference between Middle School males and JSS males in tangible achievements from farming is shown in Table 8.37.

Table 8.37: Differences in achievements between Middle School males and JSS males from farming as measured by The Wilcoxon-Mann-Whitney Test.

Levels of achievements from farming	29.2	46.2	58.9	60.4	89.6	89.6	94.9	94.9
Categories of respondents	MSm	JSS m	JSS m	MSm	MSm	MSm	JSS m	JSS m
Rank	1	2	3	4	5	5	7	7
W_{JSSm} = 2+3+7+7 =19								
W_{MSm} = 1+4+5+5=15								
$H_o = P [W_{JSSm} > W_{MSm}] = 1/2$ But, $P[W_{JSSm} > 15] =$ **.8286** where, n=4, m=4								

LEGEND:W_{JSSM} = Sum of ranks for JSS Males W_{MSM} = Sum of ranks for Middle School Males

Source: The Study

Table 8.37 shows that a significant difference exists in the achievements from farming between Middle School males and JSS males. JSS males attain more tangible achievements from farming than Middle School males. The difference in achievements between Middle and JSS females is shown in Table 8.38.

Table 8.38: Differences in achievements between Middle School females and JSS females from farming as measured by The Wilcoxon-Mann-Whitney Test.

Levels of achievements from farming	14.3	25.0	50.0	52.4	91.7	91.7	94.9	94.9
Categories of respondents	JSSm	MSm	MSm	JSS m	MSm	MSm	JSSm	JSSm
Rank	1	2	3	4	5	5	7	7
W_{JSSf} =1+ 4+7+7 =19								
W_{MSf} = 2+3+5+5=15								
$H_o = P [W_{JSSm} > W_{MSm}] = ½$ But, $P[W_{JSSf} > 15] =$ **.8286** where, n=4, m=4								

LEGEND:W_{JSSF} = Sum of ranks for JSS Females W_{MSF} = Sum of ranks for Middle School Females

Source: The Study

Table 8.38 shows that a significant difference exists in the achievements from farming between Middle School females and JSS females. The findings of all the respondent categories suggest that an academic-vocational Basic School Agriculture associates positively with higher tangible achievements from farming in the North Tongu District.

8.9 Causes of Success and Failure in Farming

The farmer respondents who said they were successful in farming were asked to indicate the factors which made them successful in farming, they listed the following factors: rainfall, effective management, supernatural intervention, planting improved varieties, credit and availability of fertile land.

When the farmers who said they were not successful in farming over the last couple of years were asked to indicate the causes of their failure, they mentioned rainfall failure, lack of tractor services on time for ploughing, supernatural powers, disease-causing rain, lack of credit and flooding. It is noted that vegetable crop farmers list disease-causing rain as a factor of failure in farming in the district.

8.10 Security in Life

The respondents were asked to indicate their perceived levels of security in life based on guaranteed means of livelihood as farmers. The means of livelihood include food security, cash income and acquired properties. The levels of security have been measured on a 5-point rating scale of very insecure, not secure, uncertain security, secure and very secure. The responses of the farmer respondents are presented in Table 8.39.

Table 8.39: Percentage distribution of respondents by perceived levels of security in life.

Respondents	% respondents and their perceived levels of security in life				
	Very Insecure	Not Secure	Uncertain Security	Secure	Very Secure
MS (N =60)	6.7	26.7	23.3	26.7	16.7
JSS (N = 60)	23.3	21.7	13.3	23.3	18.3
All Respondents (N=120)	15.0	24.2	18.3	25.0	17.5
MS Male (N = 48)	6.3	25.0	27.1	25.0	16.7
MS Female (N = 12)	8.3	33.3	8.3	33.3	16.7
JSS Male (N = 39)	15.5	23.1	12.8	28.2	20.5
JSS Male (N = 21)	38.1	19.0	14.3	14.3	14.3

Source: The Study.

Table 8.39 shows that less than 17.5 and 25.0 percent of all the farmers said they are very secure and secure respectively. While 23.3 % of the Middle School leavers said they are uncertain, an equal percentage of JSS graduates also said they are not secure. Middle School and JSS leavers indicate their levels of very Secure and secure at 16.7 / 26.7 and 18.3 / 23.3 percent respectively.

Considering the responses by sex, JSS Males are more very secure than Middle School leavers at 20.5% and 16.7% respectively. The least very secure group is JSS females.

Comparing the tangible and intangible achievement levels of the farmers, although JSS graduates attain a significantly higher levels of tangible things from farming

than Middle School leavers the former perceive a lower level of security in life than the latter.

Comparing the tangible and intangible achievement levels of the farmer respondents as shown in Table 8.35 and 8.39, those who have high cash income and properties tend to be more secure than those with low cash income and low level of property acquisition. The high level of security shown by Middle School females appears to be linked with part time farming. From Table 8.1, 66.7 percent of the Middle School females do other jobs such as trading and hair dressing. These jobs may give them extra income for acquiring properties and hence their high perceived security in life as compared to JSS females who are in full time farming.

8.11 The better farmer

To explain the performance of the Middle School and JSS leavers in farming, the various parameters measured in the study have been examined to establish relationships between them and performance. However, none of the social characteristic differences nor background farming information identified in the study explains the observations as the following: use of school-based agricultural knowledge in home farming while in school, ranking of school training as a factor influencing choice of farming as a career, ranking of crop yield optimisation practices and tangible achievements from farming.

First, inferring from Table 5.3, JSS graduates use school-based agricultural knowledge in home farming while in school more than Middle School leavers. Secondly, from Figure 7.2 JSS leavers rank school training higher as a factor

influencing them to enter into farming than Middle School leavers. Thirdly, in Table 8.18, JSS graduates rank higher row planting and improved crop varieties as yield optimisation farming practices than Middle School leavers. Again, from Table 8.17 and 8.16, more of the JSS plant crops in rows and purchase seeds from accredited seed dealers than Middle School graduates. But it should be noted that row planting and raising of improved crop varieties and animal breeds are formal agricultural knowledge and practices emphasised more in school training than in home training. Fourthly, from Table 8.9 and 8.35, JSS graduates keep farm records and attain a higher level of tangible achievements from farming than Middle School leavers.

The links between the performance of the farmers suggest that the respondents who use school-based agricultural knowledge in home-farming while at school achieve higher productivity levels and therefore develop higher value for formal knowledge than those who do not use the knowledge in home-farming. The former tend to rate higher and apply such knowledge as higher priorities in their farming activities, hence their higher levels of tangible achievements from farming. In addition, since record keeping enables effective assessment of achievements from farming, the JSS graduates may be more accurate in assessing their tangible achievements than Middle School leavers. This finding supports that of Thompson (1983) and Hartmut et al (1989) that learners who use new knowledge during the period of learning tend to internalise such knowledge and develop value for it than those who do not use the knowledge while learning.

The performance of the farmers show that JSS graduates are better farmers than Middle School leavers because the former relate their performance in farming to

formal agricultural knowledge and attain higher levels of tangible achievements from farming than the latter. A similar explanation apply to the performance of the farmers on the basis of gender.

The attainments of the respondents in intangible achievements (perceived security level in life) however, appears to be partly related to tangible achievements but not fully explained by the factors already discussed. Perhaps the criteria for perceiving levels of security in life is associated with other factors which have not been identified by the study.

8.12 Needs of the Farmers

The Young Farmer respondents were asked to identify and prioritise their needs for successful farming in their localities. The results are presented in Table 8.40.

Table 8.40: Distribution of respondents by rank scores of needs required for successful farming.

Respondents	Rank Scores of Needs of Farmers							
	Credit	Subsidy	Land	Irrigation/ Portable Water	Improved Seeds/ Breeds	Information/ Training	Tractor / Machines	Health & Marketing Facilities
M.S (N=60)	6.70	4.59	2.77	6.14	3.00	3.57	5.39	3.82
JSS (N=60)	6.78	4.72	2.53	5.55	3.18	4.16	5.42	3.51
All respondents (N=120)	6.74	4.66	2.65	5.85	3.09	3.87	5.51	3.67
M. S Male (N48)	6.58	4.56	2.74	4.11	2.92	3.55	5.45	3.80
M.S. Female (N=12)	7.17	3.71	2.88	5.92	3.33	3.63	5.17	3.46
JSS Male(N=39)	6.60	4.78	2.17	5.94	3.22	4.38	5.56	3.71
JSS Female (N=21)	7.10	4.83	3.57	4.83	3.12	3.74	5.14	3.14

Source: The Study

Table 8.40 indicates the farmers listing as many as eight needs. The list is made up of credit, subsidy, land, irrigation and portable water, improved seeds and animal breeds, information and training, tractor/machines, health and marketing facilities.

In descending order, the need of the highest priority for all the respondents is credit, irrigation/portable water is second in importance, followed by tractor and farm machines, subsidy, information and training, health and marketing facilities, improved seeds and animal breeds and finally, land. Some of the priority needs of the farmers are not strictly agricultural but developmental in nature. A typical example is heath facility.

The ranking of needs of the Middle School and JSS graduates do not differ much from each other as compared to the ranking done by all the respondents except information and training and health facilities. The JSS graduates express a higher need for information and training than Middle School leavers. However, Middle School males and JSS males deviate from each other in the ranking of some of the needs. While Middle School leavers rank tractor/machines second, JSS graduates place it third. JSS graduates rank irrigation and portable water second, Middle School leavers place it at fourth position. Again, while subsidy is fourth for JSS, Middle School graduates place it at third position. The two groups rank improved seeds at seventh and land at eighth positions in their prioritisation of the needs.

Both JSS Middle School females rank credit first in importance and improved seeds and breeds at seventh position but vary in the ranking of the other needs.

To test whether there is a common basis for ranking the needs associated with type of school attended, the Kendall Coefficient of Concordance is determined for the respondents as shown in Table 8.41.

Table 8.41: Distribution of respondent categories by The Kendall Coefficient of Concordance for ranking of needs.

Respondents	The Kendall Coefficient of Concordance for needs of farmers						
	R	$\Sigma(R_i - R)^2$	W	χ^2, if N ≥ 20	P =.05	P = .01	Df =N-1 (7-1)
MS (N=60)	4.62	15.02	0.358	150.36	S	S	7
JSS (N=60)	4.48	15.04	0.358	150.36	S	S	7
MS male (N=48)	4.22	11.72	0.279	93.74	S	S	7
MS female N=12)	4.41	15.98	0.381		S	S	7
JSS male (N=39)	4.55	15.38	0.366	99.92	S	S	7
JSS female (N=21)	4.43	12.55	0.299	43.95	S	S	7

Source: The Study

The results of the Kendall Coefficient of Concordance from Table 8.41 shows that significant levels of agreement is established in the ranking of the needs of the respective respondent categories. The implication is that each respondent category use a common criterion for ranking the needs.

Although the Kendall Coefficient of Concordance result associates with type of school attended, the Middle School and JSS graduates have the same values, implying that they use similar criterion for ranking their needs. However, JSS leavers express higher need for information and training than Middle School leavers. On the basis of sex, however, the differences between the various groups emerge as there are differences in the values of the statistic.

To sum up the findings on needs of the farmer respondents, it can be concluded that each farmer expresses the needs pertinent to his or her locality in the district. These needs relate much to the problems confronting agricultural production in the

district more than differences in type of Basic School Agriculture one pursues. Generally, the needs are based on the circumstances the farmer respondents find themselves. No one's needs are superior to those of others.

CHAPTER 9

SUMMARY, CONCLUSION AND RECOMMENDATIONS

9.1 Summary

This study is a comparison of the impact of an academic and vocational Basic School Agriculture on the performance of the graduates in farming. It is an educational outcome research on Junior Secondary School Agriculture (an academic programme) and Middle School Continuation Programme in Agriculture (a vocational programme). The study was carried out in the North Tongu District of the Volta Region of Ghana from May to June 1998.

The main objective of the study was to compare the effects of a practical and an academic-vocational Basic School Agriculture systems on the performance of the graduates in farming in the North Tongu District.

Specifically, the study was to identify the social characteristic differences between the Middle and Junior Secondary School leavers; assess, compare and explain the following: their levels of use of school agricultural knowledge in home farming while at school, differences in their agricultural knowledge levels, factors influencing choice of farming, aims for farming, utilisation of new knowledge in out-of-school farming practices; achievements in farming and their needs or constraints in farming.

The survey research methodology was employed. With a personal interview schedule, the snowball non probability sampling technique was used to gather information from

the Middle School and Junior Secondary School graduates farming in the North Tongu District. The District Agricultural Extension personnel were randomly sampled as well as JSS Agriculture Teachers.

The information gathered from the farmers included demographic characteristics, background information on home training in farming, use of school agricultural knowledge in home farming while in school, formal agricultural knowledge level on an oral test, factors influencing choice of farming as a career, aim in farming, part time farming, farm ownership status, land ownership status and levels of farm investment in improved inputs.

Other information gathered included new knowledge utilisation in general farming practices (farm enterprise planning, farm tool usage, use of other sources of agricultural production information and record keeping); crop production practices (choice of crops, land/soil testing, planting methods, post-harvest treatment, success determination in farming and causes of success and failure in farming).

Other types of data collected included animal production practices (choice of animals to keep, stock size, level of utilising new knowledge in raising animals and dependency in animal rearing). The final type of information gathered involved achievements from farming, farmers' perceived level of security in life and the needs of farmers.

Information was also collected from Agricultural Extension Agents, the District Director of Agriculture, Junior Secondary School Agriculture Teachers and the District Co-

ordinator of Agricultural Education on the state of practical work in school farms in the district.

The data was analysed using the Statistical Package for the Social Scientist (SPSS).

Using percentages, mean rank scores, Wilcoxon-Mann-Whitney Test and The Kendall Coefficient of Concordance statistics, the performance of the young farmers was assessed and compared. The Kendall Coefficient of Concordance was used to measure the levels of agreement or disagreement between the farmers for ranking factors that influence their performance in farming.

9.1.1 Key findings

The study was on the impact of the Junior Secondary School Agriculture programme and the Middle School Continuation Programme on the performance of the graduates in farming. The Junior Secondary School Agriculture programme was an academic course dealing with theory and practicum while the Middle School Continuation Programme in Agriculture was a practical one without theoretical objectives. The study focused on the impact of the differences between the two Basic School Agriculture programmes on the performance of their respective graduates in farming in the North Tongu District.

- The social characteristic differences identified between the JSS and Middle School leavers include gender, age, marital status, informal and formal agricultural education and training background. The Middle School leavers are older and married more than JSS graduates. But the two groups have similar informal training in farming in the district.
- There is generally poor management of practical farm work in schools in the district.

- Agricultural Extension programme in North Tongu District does not cater adequately for Junior Secondary School pupils in the district..
- The Junior Secondary School Agriculture programme tended to make the pupils use more school knowledge in home-farming while in school than the Middle School Continuation programme.
- The contents of the JSS Agriculture programme does not match all the knowledge and skill requirements for farming in the District.
- JSS graduates have been influenced by school agriculture to enter into farming while Middle School leavers were influenced by home training in farming.
- The Junior Secondary School Agriculture programme did not tend to influence retention of knowledge of the graduates particularly as the contents of the programme did not match all the knowledge and skill requirements for farming.
- JSS graduates tend to have commercial objectives for farming as opposed to Middle School leavers who aim at attaining food security. However, the farmers' aims for farming tended to change from cash income to food security as they grow older.
- The females in the study involved in part-time jobs and agro-processing more than the males. But agro-processing occupations are not adequately covered by the JSS Agriculture programme.
- Junior Secondary School Agriculture programme tended to make the graduates select yield optimisation practices which do not have easily observable advantages while Middle School programme influenced the selection of practices with easily observable merits.

- The graduates from the Junior Secondary School Agriculture programme tend to use new agricultural knowledge more effectively in out-of-school farming and attain higher levels of achievements than Middle School leavers.
- The graduates from the Junior Secondary School Agriculture programme did not use more new knowledge in out-of-school farming than Middle School leavers. The JSS and Middle School leavers use more Indigenous Technical Knowledge (ITK) (55.0%) as against school-based knowledge at (45.0%) in farming.
- Junior Secondary graduates tend to be more independent in animal keeping than Middle School leavers.
- Although graduates from the Junior Secondary School Agriculture programme attained higher achievements from farming, they did not appear to perceive a higher level of security in life than Middle School gradates.
- The results of the study suggest that the Junior Secondary School Agriculture curriculum design appears to be better than the Middle School Continuation programme because the JSS programme makes better farmers than the Middle School Agriculture programme.

- The better performance of the JSS graduates as compared to Middle School leavers is explained by the relationships between use of school-based agricultural knowledge in home-farming while at school, ranking of school training, ranking of row planting and use of improved varieties of crops and tangible achievements from farming.
- The needs of Middle School leavers and JSS graduates farming in the North Tongu District relate much to the problems confronting agricultural production in the district more than differences in type of Basic School Agriculture they

pursued. However, the JSS leavers expressed a higher need for training than Middle School leavers.

- The performance of the farmer respondents shows that Junior Secondary School graduates are better farmers than Middle School leavers in the North Tongu District. The former attain higher levels of achievements from farming and relate formal agricultural knowledge utilization to their achievements more than the latter. However, these differences do not fully explain their perceived levels of security in life as farmers. It appears that greater achievements from farming does not necessarily relate to a higher perceived security level in life.
- JSS males are better farmers than Middle School males because of the reasons cited for JSS graduates and Middle School leavers. JSS females are better farmers than Middle School females because of similar reasons. The performance of the JSS and Middle School males and females are explained by similar findings, logic and arguments. However, JSS females have the lowest perceived level of security in life as farmers.

9.2 Conclusion

The study compared the performance of Junior Secondary School and Middle School graduates farming in the North Tongu District. The Junior Secondary School agriculture programme was an integration of theory and practicum while the Middle School programme was purely practical without much theoretical knowledge.

The performance of the farmers shows that graduates of the Junior Secondary School Agriculture programme are better farmers than Middle School leavers. Thus, an integrated Basic agricultural curriculum tends to produce better farmers than a purely

vocational curriculum. The graduates from the Junior Secondary School Agriculture programme show a higher level of abstract thinking and action than Middle School leavers in farming.

9.3 Recommendations

The recommendations herein presented are based on the findings of the study. They have been put into two categories, namely those concerning the Basic Agricultural Education system and those that relate to Agricultural Extension Education system.

9.3.1 Formal Educational interventions

The findings of the study reveals that an academic-vocational (Integrated) Basic School Agriculture curriculum design is preferable to a practical one in terms of its impact on the learners to become effective users of science-based formal knowledge in farming. The results of the study suggest the development of a curriculum framework that should specify the balance between theory and practical work.

To achieve a balance between theory and practicum, the proportion of theory and practical components of Basic School Agriculture need to be specified during the development of the programme. Since the proportion of theory and practical work in the JSS Agriculture programme was not defined, in reviewing and revising the programme, the practical and theoretical components need to be defined.

This can be done by structuring the specific objectives of the curriculum in such a way that a specified percentage is reserved for practical skills while the remaining percentage is shared between low and high cognitive objectives. An assessment

framework should be established to guide teachers and the West African Examinations Council to assess the repertoire of practical skills and cognitive objectives prescribed by the curriculum.

The absence of guidelines for managing school farms and yield standards do not augur well for effective learning and practice of agriculture in the schools. The Ghana Education Service needs to develop guidelines for the management of school agricultural projects at the Basic Education level.

Efforts must be made to link Basic School Agriculture to research and development for sustainability. This can be achieved in three main ways; namely,

i. Organisation of Field Trips

Field Trips should be organised regularly for schools so that pupils and teachers can have direct interactions with Agricultural Researchers and projects. Pupils will have assess to research findings which can be used for teaching/learning.

ii. Dissemination of Agricultural Research Information

Agricultural Research updates which are issued annually need to be supplied to Basic School libraries so that teachers and pupils will have direct assess to them at school level.

iii. Integration of Research and School Agricultural Projects

Agricultural Research Institutes can site specific research projects at the same site within school projects. Agricultural problems in school localities will be identified and Research Institutes design experiments for the problems. The findings of such studies will be made available to schools for adoption and

implementation in school farms. This will enable exchange of research information between schools and Research Institutes.

The compulsion levels shown by the farmers for entering into farming suggests the need for diversification of the Agriculture curriculum in Basic School. Farming is not the only occupation in agriculture. It was observed that almost all the female farmers encountered in the study involved in agro-processing activities. But ironically, these are the agricultural activities the syllabus did not cover much.

The curriculum development process should take into consideration secondary agricultural production vocations such as those in agro-processing. Agro-processing occupations need to be identified and documented for curriculum development to diversify agricultural training and enhance the chances of school leavers engaging in other agricultural vocations other than farming.

The major weaknesses of the Junior Secondary Agriculture programme identified in the study include a mis-match between its content and on-farm / off-farm agricultural occupations and interference effects of Indigenous Technical Knowledge (ITK). These problems require specific interventions to address them as presented as follows.

9.3.2 Documentation of Agricultural Occupations

In order to identify the job profiles of young farmers, there is the need to identify all the agricultural occupations in the district, identify and analyse the tasks included in them to guide the curriculum development process. Such an information will be used to create

an Inventory of Agricultural Occupations (IAO) in the district level to guide curriculum developers. The inventory will provide data on the age of persons engaged in the identified occupations, their level of training, the tasks included in the vocations and standards of task performance.

The information will be used to develop demand-driven training programmes as well as teaching materials for schools in agriculture. Training programmes developed will be based on the age structure of the identified jobs such that they will be compatible with the age of the target groups and provide avenues of vertical job mobility and higher training in agriculture for those who engage in the agricultural industry.

The Inventory of Agricultural Occupations will help in diversifying the agriculture curriculum to include secondary agricultural production vocations. To encourage more young persons to take farming as a career, knowledge and skills in agro-processing to add value to products need to be taught and practised by pupils.

9.3.3 Integration of Indigenous Knowledge into school programmes

On the average, the level of formal knowledge use is 45.0% which implies that the respondents use ITK at 55.0%. The interference effects shown by the respondents is a pointer to the need to document Indigenous Technical Knowledge (ITK) for validation and integration into school curriculum. The validation will assist in eliminating ITK that is not useful. In the circumstances, where resource availability is restricted by several factors, young farmers will apply ITK as a substitute for formal agricultural knowledge.

9.3.4 In-school Follow-up Programme

The high level of non-use of school-based agricultural knowledge at 48.3% experienced by the school leavers and its consequences on their subsequent performance in out-of-school farming is a factor to consider. Despite the fact that as much as 80% of the respondents did have home training they were not allowed to utilize their new knowledge in farming at home. It is suggested that a follow-up programme be designed for in-school youth. In such a programme, qualified Agriculture Teachers who teach at the JSS level should follow-up on pupils and plan projects with the pupils in consultation with their parents to ensure that new knowledge and skills learnt at school are applied in home-farming. This would help the pupils to internalise the new knowledge acquired by developing value for it.

Competitions should be organised for schools with yield attainment standards and rewards for pupils to strive to achieve. This will help them to internalise new knowledge acquired in Basic School Agriculture.

The in-school follow-up programme should also involve Agricultural Extension to ensure the learning of new agricultural technologies introduced into the agricultural production system.

9.3.5 Out-of-school Follow-up Programme

There is the need to design a programme for the out-of-school youth involved in farming. Support systems in terms of land acquisition, credit, farm machinery, marketing, education and training to make such agricultural production resources available and accessible to young people needs to be established. Interestingly, the Youth in

Agriculture programme being pursued by the Ministry of Food and Agriculture may have to be examined to ensure that it addresses the felt needs of the young farmers in the North Tongu District. New markets need to be created to support the education system to ensure that out-of-school youth who go into farming succeed to serve as incentive and attraction to other youngsters in the district.

9.3.6 Agricultural Production Infrastructure

One major need identified in the study which influenced young farmers' performance is the inadequacy of agricultural production infrastructure. The absence of irrigation facilities, motorable roads, accessible markets and access to market information serve as disincentives to new knowledge utilization. Majority of the young farmers who met with failure in farming in the district indicated rainfall failure as the main determinant factor. Similarly, those farmers who were successful indicated rainfall as a major factor to their success. The need to provide irrigation facilities and other agricultural production infrastructure to encourage and make farming successful cannot be overemphasised. The Village Infrastructure Project (VIP) being pursued by the Ministry of Food and Agriculture should be implemented so as to ease the problems due to lack of agricultural infrastructure in the North Tongu District.

9.4 Further Research

The study has opened up new areas for investigations. First, the very topic can be investigated on national basis to make findings generalizeable instead of being limited to one district because of the important place the JSS agriculture programme occupies in the educational reforms in Ghana. There is the need to compare the performance of JSS graduates in different ecological-zones, export product

production, irrigation farming and rain-fed agricultural production to find out if these factors have any effects on their levels of new knowledge utilization and achievements from farming. In addition, several factors that affect utilization of new agricultural knowledge in farming need further investigation to provide deeper insights on them.

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APPENDIX 1

SERIAL NO.....

STRUCTURED INTERVIEW SCHEDULE FOR YOUNG FARMERS

SECTION A: DEMOGRAPHIC DATA OF FARMER

Name of farmer .....Village/Town .....

1. District .....

2. Age ..... 3a. Sex: a. . male [ ] b female [ ]

3b.Marital status: a. married[ ] b. single [ ] c. others [ ]

4. Which School did you attend? a. Middle School[ ] b. JSS [ ]

5. When did you leave School?.....year.

6. Why did you terminate school after the Middle School or JSS?

a. no Guardian [ ] b. could not get a school[ ]

c. did not pass Common Entrance|BEC Exam [ ]

d. others, specify----------

7a. When did you start farming in your life ?

a. since childhood [ ] b. after leaving school [ ] c. other, specify----------

7b.Did you follow cattle as a shepherd? a. Yes [ ] b. No [ ]

8. While in school did you grow any crop or rear any animal on your own?

a Yes [ ] b. No [ ]

9. How often did you apply what you learnt in School in your farming activities at home while in school ?

a. Never [ ] b. Rarely [ ] c. Sometimes[ ] d. Always [ ]

10. When you were in school how often did your teacher take you out to large -scale farms to observe improved agricultural production practices?

a. Never[ ]. b. Rarely[ ] c. Sometimes[ ]. d. Always[ ]

11. How long have you been farming after leaving school ?[ ]years

12. Do you farm on your own? a. Yes [ ] b. No [ ]

13. Do you do farming as a full-time job? a. Yes [ ], a. No [ ]

14. What type of farming do you do?

.a. Crops only[ ] b. Livestock only[ ] c. Poultry only[ ] d. Mixed Farming[ ]

15. What are your aims in farming? Please rank order your aims by writing 1 for your most important aim 2 for the next important etc, a. Food for the Home[ ] b. Income[ ] c. Prestige [ ] d. Others, specify .....[ ]

16. Which of the following factors influenced you most in selecting farming as a career? Please , rank order the factors that apply to you { 1} for most important factor {2 }for next important factor, etc.....

a. no other work available [ ]

b. my own interest in farming [ ]

c. knowledge and skills gained from practising farming at home[ ]

d. knowledge and skills gained from school Agricultural Science[ ]

e. capital or support from parents, relatives, friends, teachers, etc.,[ ]

f. others.....

SECTION B : AGRICULTURAL COGNITION OF FARMER

Please answer the following questions as they are read to you by selecting the correct options.

17 Which of the following best explains the quantity of macro-nutrients in a fertilizer labeled 20-20-0 ?

a. 20% Potassium 20% Phosphorus and 0% Nitrogen [ ]

b. 20% Nitrogen, 20% Phosphorus and 0% Potassium [ ]

c. 20% Nitrogen, 20% Potassium and 0% Phosphorus [ ]

18. Which of the following information is required in the correct mixing of a pesticide with water for spraying a farm?

a. The concentration of the pesticide [ ]

b The kinds of pest the pesticide controls[ ]

c. The company that produces it[ ]

19.. When your sheep is serviced on 1st January 1998 when is it likely to give birth?

a. Fourth week in March 1998[ ]

b. Fourth week in May 1998[ ]

c. Second week in June , 1998[ ]

20. A farmer obtained twenty bags of maize from a farm plot measuring one hundred metres square. What is the expression of the yield from the plot?

a. 20 bags of maize per acre [ ]

b. 20 bags of maize per hectare [ ]

c. 20 bags of maize per 100m [ ]

USE THIS INFORMATION TO ANSWER THE SUBSEQUENT QUESTION:

A farmer obtained the following amounts from a cowpea enterprise at the end of a season

i. Total sales ¢ 500,000, ii. Cost of labour ¢100,000,

iii. Total cost of other inputs ¢150,000,

21. What is the farmer's Net Margin ?

a. ¢500,000[ ]

b. ¢350,000[ ]

c. ¢250,000[ ]

SECTION C: LAND ACQUISITION PROCESS FOR FARMING

22. What is the ownership status of the land on which you farm?

a. Owned-self [ ] b. Owned-family[ ] c. Hired[ ] d. Bought [ ]

e..Communal [

f. Others ,specify……..

23. How would you rate the process of getting land to farm in this area or village?

Very Difficult	Not Easy	Somewhat Easy	Easy	Very Easy

SECTION D: FARMING ENTERPRISE PLANNING PROCESS

24. Do you plan your farming activities? a. Yes[ ] b. No [ ]

25. If yes to question 24, then tick YES if you perform the planning activities in the table below and NO if you do not . Also indicate where you learnt them .

PLANNING ACTIVITY	YES	NO	PLACE OF LEARNING Home School Others
a. Writing down of farming plans:			
b. Setting yield targets or objectives for farming enterprises.			
c. Preparing a time table for implementing farming activities.			

26. How often have you been achieving your yield targets or objectives

a. Never [ ] b. Rarely[ ] c. Sometimes[ ] d. Always[ ]

27. Why do you plan your farming activities ?Give one reason.

……

SECTION E: CROPPING PROCESS

28. Which of the following .crops do you cultivate for cash income ? Please tick as many crops as apply to you.

a. Cabbage[ ] b. Cassava [ ] c. Cowpea [ ] d. Garden Egg[ ] e. Groundnut[ ]

f. Hot Pepper[ ] . g. Maize[ ] h. Okra[ ] k Tomato [ ] m .Shallots [ ]

n. Others, specify……

29. Do you test land before selecting it for your crop enterprises? a. Yes[ ] b. No [ ]

30. If yes to question 29, then tick Yes if you perform the land and soil testing activities listed in the table below and No if you do not perform them. Also indicate where you learnt them:

LAND TESTING ACTIVITY	YES	NO
a. Determining soil texture		
b. Determining soil organic matter content		
c. Matching plants on the land to soil fertility.		
d. Determining types and amounts of plant nutrients in the soil		

31. Please tick the land preparation methods you use in the table below

Land Preparation Method	PLACE OF LEARNING		
	Home	School	Other
a. Slash and burn			
b. Ploughing only			
c. Ploughing and harrowing			
d. Zero Tillage			
e. Ridging			
f. Mounding			
g. Raised or Sunken Beds			

32.Which cropping pattern(s) do you use?

a. Monocropping[ ] b. Crop Rotation[ ] c. Mixed Cropping[ ]

d. Others, specify

33. Why do you practise the cropping pattern(s) you have listed in question 35 ?

34. Please use the table below to provide the following information:

CROP	SIZE OF FARM {Acres}	TYPE OF VARIETY PLANTED Local Improved
a. Cabbage		
b. Cassava		
c. Cowpea		
d. Garden Egg		
e. Groundnut		
f. Hot Pepper		
g. Maize		
h. Okra		
i. Tomato		
k. Shallots		

35. Where do you obtain seed or planting materials for planting?

a. Own farm[ ] b. Friends[ ] c. Open market[ ] d. Seed sellers[ ]

e. Others, specify.....

36. Please tick the kind of Planting Methods you use for the crops in the table below:

	haphazard	Row or line
a. cabbage		
b. cassava		
c. cowpea		
d. garden egg		
e. g-nut		
f. hot pepper		
g. maize		
h. okra		
i. tomato		
j. shallot		

SECTION :F FARM TOOLS USING PROCESS

37. Please list the type of tools you use for the farming tasks in the tables below.

TASK	TYPE OF TOOL	
	Indigenous	Non-Indigenous
a. Bush clearing		
b. Tree Felling		
c. Stumping		
d. Soil Digging		
e. Raised/Sunk-en Beds		
f. Ridging		
g. Mounding		
h. Weeding		

38. Do you measure the yields from your farm? a. Yes[ ] b. No[ ]

39. Which practice(s) do you adopt to improve yields of your crops? Please rank order the practices you use by writing 1 for most important, 2 for next important, etc,]

a. plant in lines[ ] b. apply fertilizers[ ]

c. use of supernatural powers[ ] d. control pests and diseases[ ]

e. plant improved varieties[ ] f. effective weed control[ ]

g. increase farm size[ ]

h. others

SECTION G: POST HARVEST TREATMENT PROCESS

40. Do you store your farm produce ? a. Yes[ ] b. No[ ]

41 If yes, to question 40, why do you store the produce? .....

.....

42. .What method of storage do you use?

a. Silo[ ] b. Cribs/Granaries[ ]

c. Others ,specify.....

SECTION H: ANIMAL PRODUCTION PROCESS

43. Do you keep farm animals? a. Yes[ ] b No [ ]

44. If no to question 43, explain why you do not keep farm animals.

.....

.....

45 If yes, to question 43, please indicate the number of your stock of animals and the systems of housing which you use for them in the table below:

NAME OF FARM ANIMAL	NUMBER	SYSTEM OF HOUSING		
		Free Range	Semi-Intensive	Intensive
a. Cattle				
b. Sheep				
c. Goat				
d Chicken				
e Duck				
f Guinea Fowl				
g Turkey				
h Pig				
i Rabbit				
j Grasscutter				
k Guinea Pig				

46. Please rank the animal production tasks in the table below on the following bases:

1.= I do not do it.

2 = I do it with the help of other people.

3 = I do it all by myself.

Also tick and indicate where you learnt them

ANIMAL PRODUCTION ACTIVITY	RANKING ORDER		
	1	2	3
a. Constructing standard animal housing			
b. Marking or Identifying animals			
c. Keeping female and male animals in separate pens			
d. Preparing balanced animal feed			
e. Developing a medication schedule for animals			
f. Vaccinating farm animals			
g. Control ectoparasites by spraying			
h. Control endoparasites by drenching			
i. Preparing a breeding programme			
j. Treating injuries cuts and fractures in farm animals			
k. Preparing housing for pregnant animals			
l. Assisting pregnant animal when giving birth			
m. Removing milk teeth in piglets			
n. Disinfecting the navel of newly born animals			

p. Milking of cows			
q. Sexing young rabbits			
r. Castration of farm animals			
s. Restraining animals			
t. Dehorning animals			
u. Disbudding farm animals			
v. Trimming of hoofs of farm animals			

SECTION I : FARM PRODUCE DISPOSING PROCESS

47 Do you divide your farm produce into parts before disposing of them? a. Yes[ ] b. No [ ]

48. If yes to question 47, into what parts do you divide the produce?.....

49 If yes to question 48, what proportions of the produce are used for the following:.

Portion of Produce for:	**Fraction** crops / animals
Home Consumption	
Seed	
Sale	
Gift	
Others	

50. Where do you sell your farm produce?

a. Farm gate[ ] b. Local Market[ ] c. Others .....

A. Animal produce (a) [ ] (b) [ ] (c)[ ]

B. Crop produce (a) [ ] (b) [ ] (c). [ ]

51. What factors guide you in pricing the produce? Please rank order the factors as you apply them.

a. prevailing market price[ ]

b. cost of production[ ]

c. demand level available on the market[ ]

d. supply level available on the market[ ]

e. own cash needs[ ]

f. others.....

SECTION J: FARM INVESTMENT PROCESS

52. Please provide the amounts you spent on the inputs in the table below in 1997.

Input Item	Amount Spent (¢)
a. Tractor services	
b. Improved seeds/planting materials	
c. Fertilizers	
d. Pesticides	
e. Spraying	
f. veterinary drugs	
g. Others.....	

SECTION K: RECORD KEEPING AND ACCOUNTS.

53. Do you keep records on your farming activities? a. Yes[ ] b. No[ ]

54. If no to question 53, why not? Please tick one.

a. not useful [ ]

b. wastes time[ ]

c. laziness[ ]

d. I do not understand it[ ]

e. Others, specify.....

SECTION K: BELIEFS ON PESTS AND DISEASES IN FARMING

55. Please rank the statements in the table below on the basis of your own beliefs:

STATEMENT ON PESTS AND DISEASES	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
a. Diseases in crops are caused by pathogens					
b. Some diseases in crops and animals are caused by supernatural powers					
c. Total destruction of a crop or livestock enterprise is due to supernatural powers					

SECTION L: CRITERIA FOR ASSESSING SUCCESS IN FARMING

56. Have you been successful in farming in the last couple of years?

a. Yes[ ] b. No[ ]

57. .If yes, to question 56, what did you achieve which indicated your success in farming?

Please you can tick as many as apply to you.

a. High Yield [ ] b. Family Food [ ] c. Cash Income[ ]

d. d. Acquired Properties[ ] Others, specify.....

58. What would you consider as the main factors which enabled you to be successful in farming that year? Please tick as many as apply in your case.

a. Natural factors(e.g. rainfall)[ ]

b. Good management practices (planting on time, etc)[ ]

c. Supernatural factors (prayers, luck, gods help etc.)[ ]

d. Planting improved varieties[ ]

e. Availability of credit on time [ ]

f. Application of fertilizers [ ]

g. Others specify.....

59. If you were not successful in your farming activities, what did you consider as the main causes to your failure in farming? Please tick as apply in your case.

a. Natural factors (rainfall failure, diseases and pests etc...) [ ]

b. Poor knowledge and management practices (late planting etc.) [ ]

c. Supernatural factors (curses, no luck, witchcraft etc..) [ ]

d. Economic factors (lack of credit etc) [ ]

e. Non-availability of tractors for ploughing on time [ ]

f. Others

60. What do you need to become a successful farmer ? Please list six of your needs in order of importance.

1 2

3.....4.

5. 6.

SECTION M: USE OF AGRICULTURAL EXTENSION ADVICE

61. Do you have contact with Agricultural Extension Agent? a. Yes[ ] b No[ ]

62. If no to question 61, what prevents you from contacting an Agricultural Extension Agent?

.....

63. How would you agree or disagree with the following statement : It is necessary for a farmer to listen to Extension Agent's Advice.

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree

64. Besides the Agricultural Extension Agent, what other sources of information do you consult for new ideas to improve your farming?.....

SECTION N : PARTICIPATION IN FARMER ASSOCIATIONS

65. Do you belong to any farmer association in the area (village or town)?

a. Yes[ ] b. No[ ]

66. List the names of the farmer associations you belong to:.....

67.. How would you rate your future security in life as a young farmer ?

Very Insecure	Not Secure	Uncertain Security	Secure	Very Secure

Thank you

APPENDIX 2

QUESTIONNAIRE FOR AGRICULTURAL EXTENSION AGENTS

SECTION A: DEMOGRAPHIC DATA OF AGRICULTURAL EXTENSION AGENT

Name {optional}.....

1. District----------2. Operational Area----------

3. Number of years experience in service ----------

4. Number of years in district ----------

SECTION B:NEW AGRICULTURAL TECHNOLOGIES IN THE DISTRICT

5. Please list the names of agricultural technologies introduced into your Operational Area after 1987 in the table below :

Table 1:New Agricultural Technologies in the district 1988-1997

YEAR	NAME OF TECHNOLOGY
1988	
1989	
1990	
1991	
1992	
1993	
1994	
1995	
1996	
1997	

SECTION C: DISTRICT AGRICULTURAL EXTENSION PROGRAMME FOR SCHOOLS

6. Do you have agricultural extension programmes for Junior Secondary Schools in your Operational Area a. Yes[ ] b. No [ ] ?

7. If yes, to question 6.how often do you visit Junior Secondary Schools in your Operational Area to demonstrate new agricultural technologies to them in a year ?...

a. Never[ ] b. Rarely[ ] c. Sometimes[ ] d. Always [ ]

8. Please list three new agricultural technologies that you have delivered to JSS in your Operational Area ?

a .----------

b. ----------

c. ----------

9. If no to item ,6 please explain why you do not visit the JSS to demonstrate new agricultural technologies to them ?

……

……

……

SECTION: D IDENTIFICATION OF JSS GRADUATES IN FARMING

10. Do you identify Young Persons who enter into farming every year in your Operational Area? a. Yes[ ] b. No[ ]

---

11. If no to question 10 ,why not ? Please explain:

……

……

……

12. If yes to question 10.what mode of contact do you have with the Young Farmers ?

a. Individual [ ] b. Group [ ]

c. Others, specify .....

13. Please list three new agricultural technologies you have taught the Young Farmers

a. ----------

b. ----------

c. ----------

14. Have they been practising the new technologies you have taught them ?

a. Yes [ ] ,b. No [ ] c. Uncertain[ ]

SECTION E: OPERATIONAL AREA CROP YIELD STANDARDS

15. Please state the average yield per hectare of the crops listed in table 2 below in your Operational Area.

Table 2:Average yields of crops in the Operational Area.

CROPS	YIELD PER HECTARE
Cassava	Tubers Tons or Gari Maxi bags
Cowpea	Maxi bags
Garden Egg	Kg or Maxi bags
Groundnut	Unshelled Maxi bags or Shelled Kg
Hot Pepper	Fresh Fruits Kg Dried Fruits Maxi bags
Maize	Maxi bags
Okra	Fresh Fruits Kg
Shallots	Kg
Cabbage	Kg

SECTION F: DISTRICT INVENTORY OF ON-FARM AGRICULTURAL OCCUPATIONS

16. Please rank order the following on-farm agricultural enterprises in your zone in order of importance. List 1 for most important in each group,,2 for next important etc

GROUP 1: RUMINANT PRODUCTION ENTERPRISES

1. Cattle Production [ ]
2. Goat Production [ ]
3. Sheep Production [ ]

GROUP 2 : POULTRY PRODUCTION ENTERPRISES

4. Chicken Production (*Layers*) [ ]
5. Chicken Production (*Broilers)* [ ]
6. Duck Production [ ]
7. Guinea Fowl Production [ ]
8. Pigeon Production [ ]
9. Turkey Production [ ]
10. Ostrich Farming [ ]

GROUP 3 : NON -RUMINANT PRODUCTION ENTERPRISES

11. Grasscutter Production [ ]
12. Guinea Pig Production [ ]
13. Pig Production [ ]
14. Rabbit Production [ ]

GROUP 4 : NON TRADITIONAL ANIMAL ENTERPRISES

15. Snail Production [ ]
16. Bee Keeping [ ]
17. Fish Farming [ ]

GROUP 5: VEGETABLE FARMING ENTERPRISES

18. Okro Production [ ]
19. Tomato Production [ ]
20. Onion Production [ ]
21. Shallot Production [ ]
22. Carrot Production [ ]
23. Lettuce Production [ ]
24. Hot Pepper Production [ ]
25. Cabbage Production [ ]
26. Others, specify……

GROUP 6: CEREAL PRODUCTION ENTERPRISES

27. Maize Production [ ]
28. Rice Production [ ]
29. Guinea Corn Production [ ]
30. Millet Production [ ]

GROUP 7: LEGUME PRODUCTION ENTERPRISES

31. Bambaranut
32. Cowpea
33. Groundnut
34. Yam Beans
35. Soya Bean
36. Others, specify……..

GROUP 8: ROOT AND TUBER CROP PRODUCTION ENTERPRISES

37. Cassava Production [ ]
38. Yam Production [ ]
39. Sweet Potato Production [ ]
40. Fan Palm Yam Production [ ]
41. Tiger Nut Production [ ]
42. Cocoyam Production [ ]

GROUP 9: FRUITS /TREE CROP PRODUCTION ENTERPRISES

43. Citrus Production [ ]
44. Mango Production [ ].
45. Pineapple Production[ ]
46. Plantain Production[ ]
47. Woodlot Production[ ]

GROUP 10: LESSER FRUITS ENTERPRISES

48. Date Palm Production[ ]
49. Cashew Production-[ ]
50. Fan Palm (*Agor*) Production [ ]
51. Guava Production[ ]
52. Hog Plum *(Akukor*) Production[ ]
53. Miraculous Berry Production[ ]
54. Velvet Tamarind (A*tite*) Production [ ]
55. Vitex (*For*) Production -[ ]
56. Soursop (*Voduba)*

NB: Local names in italics and parenthesis

GROUP 11: INDUSTRIAL CROP PRODUCTION ENTERPRISES

57. Coconut Production [ ]
58. Cotton Production [ ]
59. Oil Palm Production [ ]

d. Tobacco Production [ ]

60. Sugarcane Production [ ]

GROUP 12 :FOOD PROCESSING ENTERPRISES

61. Cattle Milk Processing [ ]
62. Cassava Processing [ ]
63. Coconut Oil Processing [ ]
64. Fish Processing [ ]
65. Groundnut Oil Processing [ ]
66. Palm Kernel Oil Processing [ ]
67. Palm Oil Processing [ ]

17. What other relevant information do you have on young farmers in your Operational Area?

.....

.....

.....

.....

APENDIX 3

QUESTIONNAIRE FOR JUNIOR SECONDARY SCHOOL AGRICULTURE TEACHERS

SECTION A: DEMOGRAPHIC DATA OF TEACHER

1. District……2. Circuit……..

3 Name of School.:.....4. Name of Teacher……

5. Sex ,a. male[ ] b. female [ ]

6. Professional Qualification.....

8. Number of years of teaching .....

9. Number of years in teaching Agriculture .....

10. Number of years of teaching in this school……

SECTION B: QUANTITY AND QUALITY OF JSS AGRICULTURAL EDUCATION . MATERIAL RESOURCES

11. When did your School start the Agricultural Science programme ?..19.....year

12. Please provide the information required in the table below for the 1-4 years that your school started running the Agricultural Science programme:

YEAR	TOTAL SCHOOL ENROLMENT	NUMBER OF CLASSES

13. Did your school satisfy any specific conditions before mounting the Agriculture Programme ? a. Yes[ ] b. No [ ]

14. If yes to question 13, please state the conditions:

……

……

15. Please provide the information required in the table below:

Agric. Education Materials

Item	Number of items in your school	Adequate	Not Adequate	Minimum Class size of students who use it.
Hoe				
Spade				
Shovel				
Rake				
Mattock				
Earth Chisel				
Pick Axe				
Axe				
Foot Fork				
Hoe-Fork				
Wheel Barrow				
Hand Fork				
Measuring Tape				
Garden Line				
Ranging Pole				
Watering Can				
Cutlass				
Weighing Scale				
Knapsack Sprayer				
Pruner				
Secateurs				
Shears				
Burdizzo				
Eartag Applicator				
Drenchers Emasculator				
Hand Sprayer				

SECTION C: USE OF FACILITIES FOR TEACHING JSS AGRICULTURE

16. Please indicate Yes if your school has the facilities listed in the table below and No if you do not Also indicate whether they are adequate or not adequate:

Facilities for teaching Practical Agriculture at JSS

Facility	YES NO	Adequate	Not Adequate
Land space for Agriculture			
Laboratory			
Vegetable Unit/Garden			
Arable Crop Unit			
Fish Farms (Pond)			
Livestock Unit			
Farm Machines Shop			
Farm Implements			

17. Do you have written guidelines for the management of School Farms?

a. Yes [ ] b. No [ ]

18. If yes, to question 17, what are the objectives for the use of the following physical facilities:

a. Land Space.....

b. School Farm.....

c. Fish Pond.....

d. Livestock Unit. .....

19. Does your school have standards of performance for practical skills?

a Yes [ ] b .No [ ]

20. If yes, to question 19, whose standard of performance in agricultural production is your school's performance compared with in the area ?

(a) peasant farmers [ ]

(b) Commercial farmers [ ]

c) Agricultural Research Stations [ ]

(d) Others, specify:.....

21. What use is made of school farms by farmers in the local community?

.....

.....

22. Which of the following practical skills do you mostly emphasise in class instruction in your school? Please rank order the practical skills, (1) for the most emphasised, (2) for the next etc.

[ ] Analytical skills [ ] problem-solving skills

[ ] Decision-making skills [ ]Responsibility skills

[ ] managerial skills [.] manipulative skills

23. Do you have records of the average crop yields in school farms over the years?

a.Yes[ ] b. No[ ]

24. If yes to question 23, please state the average yield per hectare of the crops in the table below:

Average yield of crops in Junior Secondary School farms.

Crop	Average Yield per hectare
Cassava	Tubers Tons Gari Maxi bags
Maize	Maxi bags
Groundnut	Unshelled Maxi bags Shelled Maxi bags
Okra	Baskets
Garden Egg	Baskets
Hot Pepper	Dried Fruits Maxi bags
Tomato	Crates Baskets
Shallots	Baskets
Cabbage	Kg.

SECTION D: JSS AGRICULTURE TEACHER SITUATION

25. Please, provide the required information on agriculture teacher situation in your school as indicated and tick whether it was adequate or not adequate as shown in the table below.

Agriculture Teacher situation in Junior Secondary Schools

Year	AGRIC. TEACHER AVAILABLE? YES NO	Male	Female	Trained	Untrained	Adequate	Not Adequate
1987/88							
1988/89							
1989/90							
1990/91							
1991/92							
1992/93							
1993/94							
1994/95							
1995/96							

26. How would you rate the adequacy of the resources available for implementing the JSS Agriculture programme in your school in general?

Very Inadequate	Not Adequate	Somewhat Adequate	Adequate	Very Adequate

SECTION E: APPROACHES TO THE TEACHING OF JSS AGRICULTURE:

27. What is the weekly time allocation for teaching Agriculture in your school in terms of:

a. Theory?.....hours, and b. Practical: .....hours.

28. Which of the following agriculture teaching methods do you apply most in your school? Please rank order the most frequently used method as 1 and the least used method as 12. The methods are:

[ ]	Projects	[ ]	Question and Answer
[ ]	Lecture	[ ]	Problem-solving/Discovery
[ ]	Demonstration	[ ]	Field Trip
[ ]	Discussion/Brainstorming	[ ]	Role Playing
[ ]	Supervised Practice	[ ]	Exhibitions
[ ]	Futures' wheel	[ ]	Value Clarification

29. Which of the following techniques for teaching agriculture do you use most frequently in your school? Please rank order the techniques(1 - 7)

[ ]	Questioning	[ ]	Hearing/Listening
[ ]	Assignments	[ ]	Observation
[ ]	Note-taking	[ ]	Practice
[ ]	Reading Textbooks or References		

30. How would you rate the effectiveness of the teaching of practical farm work skills in your school?

Not Effective	of little Effectiveness	Somewhat Effective	Effective	Very Effective

31. How would you rate the effectiveness of imparting theoretical knowledge in agriculture to Junior Secondary School students in your school?

Not Effective	of little Effectiveness	Somewhat Effective	Effective	Very Effective

SECTION F: LINKS BETWEEN JSS AND NEW AGRICULTURAL TECHNOLOGIES.

32. Do you have strategies for incorporating new agricultural technologies into the JSS Agriculture programme in your school? a. Yes[ ] b. No [ ]

33. If yes to question 32 ,please describe the strategies:.....

.....

34. How would you rate the success of incorporating new agricultural technologies into the JSS Agriculture programme?

Very Unsuccessful	Not Successful	Somewhat Successful	Successful	Very Successful

SECTION G: FOLLOW-UP ACTIVITIES ON JSS GRADUATES

35. Do you have a compilation of Basic Education Certificate Examination results in Agricultural Science in your school over the years? a. Yes[ ] b. No [ ]

36. If yes to question 35, please provide the information required on JSS graduates in the table below

YEAR	TOTAL NO. OF CANDIDATES PRESENTED	NO. OF PASSES		NO. ADMITTED INTO AGRIC. PROGRAMMES AT SECONDARY LEVEL		NO. IN FARMING	
		MALE	FEMALE	MALE	FEMALE	MALE	FEMALE
1990							
1991							
1992							
1993							
1994							
1995							
1996							
1997							
1998							

37. Do you have any programme for JSS graduates in farming in your locality?

a. Yes[ ] b. No[ ]

38. If yes to question 37, please describe the programme for JSS graduates in farming in your locality:.....

.....

39. Please provide any other relevant information on JSS and Middle School graduates farming in your locality which has not been covered so far.

.....

.....

THANK YOU VERY MUCH.

APPENDIX 4

SERIAL NO.....

QUESTIONNAIRE FOR DISTRICT DIRECTORS OF AGRICULTURE

SECTION A: DEMOGRAPHIC DATA OF DISTRICT DIRECTOR OF AGRICULTURE

Name {optional}.....

1. District:.....

2. No. of years in district:.....

SECTION B: AGRICULTURAL PRODUCTION POTENTIALS OF THE DISTRICT

3. What is the total land area of your district?.....km^2.
4. What percentage of the land is suitable for farming?.....
5. What percentage of the land is already farmed? .....
6. What is the average farm-size in the district ?

a. Crops.....Hectares

b. Poultry.....

c. Livestock.....

7. Do you have records of average yields of crops cultivated in the district?

a. Yes[ ] b. No [ ]

8. If yes to question 7 , please provide the average yields of crops listed in the table below:

CROP	YIELD PER HECTARE
Cabbage	Kg
Cassava	Tubers Tons or Gari Maxi bags
Cowpea	Kg Maxi bags
Garden -Egg	Fruits Kg
Groundnut	Unshelled Maxi bags or Shelled Maxi bags
Hot Pepper	Dried Fruits Maxi bags
Maize	Grains Maxi bags
Okra	Fruits Kg
Tomato	Crates or Kg
Shallots	Kg

SECTION C: PROGRAMMES FOR YOUNG FARMERS

9. Does the district have specific programmes for young people?

a. Yes [ ] b.No[ ]

10. If yes to question 9, please provide the names of the programmes.

.....

.....

11. What are the objectives of the programme for Young Farmers in the district?

.....

.....

.....

12. What are the support programmes for Young Farmers in terms of:

a. Land acquisition for farming?

.....

b. Credit for farming.....

.....

Subsidy on farm inputs.....

.....

d. Mechanical Services.....

.....

e. Storage of farm produce.....

.....

f. Marketing of farm produce.....

.....

g. Training and Education.....

.....

13. How would you rate the support system for Young Farmers in your district?

Very Inadequate	Not Adequate	Uncertain	Adequate	Very Adequate

14. How long has the programme been going on in the district?.....

15. Are there other Governmental or Non-Governmental Organizations (NGOs) responsible for young people in the district: Yes [ ] No [ ]

16. If yes, please provide their names and locations.

Name of the organizations.....

Location:.....

17. How would you rate Young People's access to agricultural production resources in your district?

No Access	Low Access	Medium Access	High Access

THANK YOU VERY MUCH

APPENDIX 5

SERIAL NO.....

QUESTIONNAIRE FOR DISTRICT AGRICULTURAL EDUCATION CO-ORDINATORS

SECTION A: DEMOGRAPHIC DATA OF EDUCATION OFFICER

1. Name of District.....
2. Name of Education Officer:{optional}.....
3. Rank:.....4. Position:.....
5. Sex a. male[ ] b. female [ ]
6. Professional Qualification.....
7. Subject Area of qualification.....
8. Number of years of experience in teaching.....
9. Number of years in teaching Agriculture.....

SECTION B: QUANTITY AND QUALITY OF JSS AGRC. MATERIAL RESOURCES

10 How many Junior Secondary Schools are in your district in 1998.....

11. How many were in 1987 .....

12. What were the conditions to be satisfied by Junior Secondary Schools in mounting the Agriculture Programme in your district.....

.....

13. Please state the number of agricultural education materials available to each JSS in your district and tick whether they are adequate or Not Adequate as well as the number of JSS without the materials in the table below:

Agric. Education Materials

Item	Number of item per JSS	Adequate	Not Adequate	Number of JSS without the item
Hoe				
Spade				
Shovel				
Rake				
Mattock				
Earth Chisel				
Pick Axe				

Axe				
Foot Fork				
Hoe-Fork				
Wheel Barrow				
Hand Trowel				
Hand Fork				
Land Chain				
Measuring Tape				
Garden Line				
Ranging Pole				
Watering Can				
Cutlass				
Weighing Scale				
Knapsack Sprayer				
Pruner				
Secateurs				
Shears				
Eartag Applicator				
Burdizzo				
Drenchers				
Emasculator				
Hand Sprayer				

SECTION C: USE OF FACILITIES FOR JSS AGRICULTURE

14 Please state in the table below the number of JSS in your district which have the facilities listed and tick whether they were adequate or not adequate. Also indicate the number of JSS without the facility.

Facilities for teaching JSS Agricultural Science

Facility	**Number of Schools with the facility**	**Adequate**	**Not Adequate**	**Number of JSS without the facility**
Land space forAgric. **Laboratory** **Vegetable Unit/Garden** **Arable Crop Unit**				

Livestock Unit **Fish Farms (Pond)** **Farm Machine Shop** **Farm Implements**				

15. Does the District have written guidelines for schools to manage the School Farms?

a. Yes [ ] b. No [ ]

16. If yes,to question 15, what are the objectives for the use of the following physical facilities:

a. Land space:.....

b. School Farm:.....

c. Fish Pond:.....

.....

17. Do JSSs have standards of performance in agricultural production:

a Yes [ ] b .No [ ]

18. If yes, to question 17, whose standard of performance in agricultural production is school performance compared with in the district?

(a) Peasant Farmers [ ]

(b) Large-Scale Farmers [ ]

(c) Agricultural Research Stations [ ]

(d) Others, specify:.....

19. What use is made of school farms by farmers in the local community?

[ ] Analytical skills [ ] problem-solving skills

[ ] Decision-making skills [.] manipulative skills

[ ] managerial skills [ ]Responsibility skills

21. Do you have records of the average crop yields in school farms in your district?

a. Yes [ ] b. No [ ]

22. If yes to question 21. please state the average yield per hectare of the crops in school farms in your district in the table 3 below:

Average yield of crops in district schools farms.

Crop	Average Yield per hectare		
Cassava	Tubers	Tons Gari	Maxi bags
Maize		Maxi bags	
Groundnut	Unshelled	Maxi bags Shelled	Maxi bags.
Okra		Baskets or	Kg.
Garden Egg		Baskets	
Hot pepper	Dried Fruit	Maxi bags	
Tomato		Crates	Baskets
Shallots		Baskets	
Cabbage		Kg	

SECTION D: JSS AGRICULTURE TEACHER SITUATION

23. Please, provide the required information on agriculture teacher situation in your district and tick whether it was adequate or not adequate as shown in the table below.

Agriculture Teacher situation in the district.

Year	Total Number	Male	Female	Trained	Untrained	Adequate	Not Adequate
1987/88							
88/89							
89/90							
90/91							
91/92							
92/93							
93/94							
94/95							
95/96							
96/97							
97/98							

24. How would you rate the adequacy of the resources available for implementing the JSS Agricultural Science programme and in your district in general?

Very Inadequate	Not Adequate	Somewhat Adequate	Adequate	Very Adequate

SECTION E: APPROACHES TO THE TEACHING OF JSS AGRICULTURE IN THE DISTRICT

25. What is the weekly time allocation for teaching Agriculture at the JSS in terms of:

a. Theory?.....hours, and b Practicals: .....hours.

26. Which of the following agriculture teaching methods are applied most in your district? Please rank order the most frequently used method as{1} and {2} for the next used method, etc,

[ ]	Projects	[ ]	Question and Answer
[ ]	Lecture	[ ]	Problem-solving/Discovery
[ ]	Demonstration	[ ]	Field Trip
[ ]	Discussion/Brainstorming	[ ]	Role Playing
[ ]	Supervised Practice	[ ]	Exhibitions
[ ]	Futures' wheel	[ ]	Value Clarification

28. Which of the following techniques for teaching agriculture are most frequently used in your district ? Please rank order the techniques(1 - 7)

[ ]Questioning [ ]Note-taking [ ]Practice

[ ]Observation [ ]Assignments [ ]Hearing/Listening

[ ]Reading Textbooks or References

29. How would you rate the effectiveness of training JSS students in practical farm work skills in your district?

Not Effective	of little Effectiveness	Somewhat Effective	Effective	Very Effective

30. How would you rate the effectiveness of imparting theoretical knowledge in agriculture to JSS students in your district?

Not Effective	of little Effectiveness	Somewhat Effective	Effective	Very Effective

SECTION F: LINKS BETWEEN JSS AND NEW AGRICULTURAL TECHNOLOGIES.

31 Do you have strategies for incorporating new Agricultural technologies into the JSS Agriculture programme in your district?a. Yes[ ] b. No[ ]

32. If yes to question 31,please describe the strategies to incorporate new Agricultural technologies into the JSS Agricultural programme in your district?

.....

.....

33. How would you rate the level of success of incorporating new agricultural technologies into the JSS Agriculture programme?

Very Unsuccessful	Not successful	Somewhat Successful	Successful	Very Successful

SECTION G: FOLLOW-UP ACTIVITIES ON JSS GRADUATES

34. Do you have a compilation of the Basic Education Certificate Examination results in Agricultural Science in your district over the years? a. Yes[ ] b. No[ ]

35. If yes to question 34,.please provide the information required on JSS graduates in the table below:

Performance of JSS graduates in Agricultural Science at Basic Education Certificate Examination (BECE) and Placement in the district.

YEAR	TOTAL NO. OF CANDIDATES PRESENTED	NO. OF PASSES		NO. ADMITTED INTO AGRIC. PROGRAMME S AT SENIOR SECONDARY LEVEL	NO. IN FARMING	
		MALE	FEMALE	MALE: FEMALE	MALE	FEMALE
1990						
1991						
1992						
1993						
1994						
1995						
1996						
1997						

36 Do you have any programme for JSS graduares in farming in your district?

a. Yes [ ] b. No[ ]

37. If yes to question 36 ,please describe the programmes for JSS graduates in farming in your district?

.....

38. Please provide any other relevant information on JSS graduates in farming in your district which has not been covered so far

.....

THANK YOU

APPENDIX 6

DISTRICT INVENTORY OF ON-FARM AGRICULTURAL OCCUPATIONS

1.1 RUMINANT PRODUCTION ENTERPRISES

1.1 1 Cattle Production
1.1.2 Goat Production
1.1.3 Sheep Production

1.2 POULTRY PRODUCTION ENTERPRISES

1.2.1. Chicken Production (*Layers*)
1.2.2. Broiler Production
1.2.3. Duck Production
1.2.4. Guinea Fowl Production
1.2.5. Pigeon Production
1.2.6. Turkey Production
1.2.7 Ostrich Farming

1.3. NON -RUMINANT PRODUCTION ENTERPRISES

1.3.1. Grasscutter Production
1.3.2. Guinea Pig Production
1.3.3. Pig Production
1.3.4. Rabbit Production

1.4 NON TRADITIONAL ANIMAL ENTERPRISES

1.4.1 Bee Keeping [ ]
1.4.2 Fish Farming [ ]

1.5 VEGETABLE FARMING ENTERPRISES

1.5.1 Okro Production
1.5.2 Tomato Production
1.5.3 Onion Production
1.5.4 Shallot Production
1.5.5 Carrot Production
1.5.6 Hot Pepper Production
1.5.7 Cabbage Production

1.6 CEREAL PRODUCTION ENTERPRISES

1.6.1 Maize Production
1.6.2 Rice Production
1.6.3 Millet Production

1.7 LEGUME PRODUCTION ENTERPRISES

1.7.1 Bambaranut Production [ ]
1.7.2 Cowpea Production [ ]
1.7.3 Groundnut Production [ ]
1.7.4 Yam Beans Production [ ]

1.8 ROOT AND TUBER CROP PRODUCTION ENTERPRISES

1.8.1 Cassava Production [ ]
1.8.2 Yam Production [ ]
1.8.3 Sweet Potato Production [ ]
1.8.4 Fan Palm Yam Production [ ]
1.8.5 Tiger Nut Production [ ]
1.8.6 Cocoyam Production [ ]

1.9 FRUITS /TREE CROP PRODUCTION ENTERPRISES

194.1 Citrus Production
1.9.2 Mango Production
1.9.3 Pineapple Production
1.9.4 Woodlot Production

1.10 LESSER FRUITS ENTERPRISES

1.10.1. Date Palm Production[ ]
1.10.2. Cashew Production-
1.10.3. Fan Palm (*Agor*) Production
1.10.4. Guava Production

1.10.5 Soursop (*Voduba)*

1.11 INDUSTRIAL CROP PRODUCTION ENTERPRISES

1.11.1 Coconut Production
1.11.2 Oil Palm Production
1.11.3 Sugarcane Production

1.12 FOOD PROCESSING ENTERPRISES

1.12.1 Cattle Milk Processing
1.12.2 Cassava Processing
1.12.3 Coconut Oil Processing
1.12.4 Fish Processing
1.12.5 Groundnut Oil Processing
1.12.6 Palm Kernel Oil Processing
1.12.7 Palm Oil Processing