UNIVERSITY OF CAPE COAST

PROSPECT FOR DEVELOPING SCHOOL BASED EXTENSION SUPPORT SYSTEM IN THE CENTRAL REGION OF GHANA

BY

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APRIL 2005

CANDIDATE'S DECLARATION

I hereby declare that this thesis is the result of my own original research and that no part of it has been presented for another degree in this University or elsewhere.

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SUPERVISORS' DECLARATION

We hereby declare that the preparation and presentation of the thesis were supervised with the guidelines on supervision of thesis laid down by the University of Cape Coast.

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ABSTRACT

The study was a survey conducted two phases in six randomly selected districts of the Central Region of Ghana to determine the prospect for developing an extension support system that is based in junior secondary schools (JSS) and senior secondary schools (SSS) The first phase was to find the perceived need and required conditions and inputs for an extension support system in JSS and SSS. The second phase was to determine the presence or absence, and the strengths or weaknesses of the required conditions and inputs perceived by respondents in the first phase to have influence on the school based extension support system.

Probability sampling techniques were used to select a sample size of 442 respondents comprising agricultural extension agents (AEAs), agricultural science teachers (ASTs) and headmasters in SSS and JSS, district agricultural development officers (DDOs) and farmers. Data collecting instrument was validated questionnaires (and structured interview for illiterate farmers). Data were analysed using percent frequencies, relative frequencies and means. The prospect for school based extension support system (SBESS) was determined by SWOC and force field analyses.

Findings revealed a wide age range among farmers. Educational qualifications of school heads and agricultural science teachers were quite high, as required by the policy of the ministry of education and Sports. However, almost all the AEAs were educated only up to the certificate level. Farmers had very low levels of formal education.

Result showed an important need for an extension support system in the Central Region. Prospect for SBESS was perceived as high, but higher in the JSS than SSS. This could be attributed to closeness of the JSS to the farmers' as a

result of it being community based. Agricultural science teachers, AEAs, students and farmers were considered as relevant participants of SBESS. School heads and DDOs were considered as supervisors.

Major required conditions and inputs for SBESS were; available time, perceptions, attitudes and motivation of relevant participants; their competency levels and education and cooperation among them; availability and quality of students' agricultural club, farm and farm equipment in the schools, and favourable curricular, administrative and policy environments.

Over 38.0% of JSS in the study did not have school farms, but 36.7 percent had farms that were suitable for SBESS. All the SSS had school farms, but only 23.8% of the farms were considered as suitable for SBESS

SWOC analysis revealed that the strongest driving forces for SBESS were high level of motivation among the relevant participants, good cooperation spirit between AEAs and ASTs (especially in the JSS), favourable attitudes of relevant participants, and favourable policy environment. The strongest restraining forces were: low level of education among farmers, inadequate supervision of agricultural activities in the schools, inadequate funding of school agricultural activities, and non-existence of active students' agricultural club in schools.

Force field analysis revealed positive prospect for SBESS in both JSS and SSS, but higher in the JSS. The prospect can be improved by overcoming the major restraining forces

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LIST OF ACRONYMS AND ABBREVIATIONS:

AEA(s):	Agricultural extension agent(s)
AST(s)	Agricultural science teacher(s)
DDO:	District agricultural development officer
FAO:	Food and Agricultural Organisation of the United Nations
FFA	Force field analysis
FMR	Farmer
JAST	Junior secondary school agricultural science teachers
JSS:	Junior secondary school
MOES:	Ministry of Education and Sports, Ghana.
MOFA:	Ministry of Food and Agriculture, Ghana.
SAST	Senior secondary agricultural science teachers
SBESS	School based extension support system
SSH	Senior secondary school headmaster/headmistress
SSS	Senior secondary school
STD	Student
SWOC	Analysis of strengths, weaknesses, opportunities and constraints.
SWOT	Analysis of strengths, weaknesses, opportunities and threats

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The development of a sustainable agriculture for increasing food production and food security while managing natural resources has been identified as the reliable long-term strategy for rural development (FAO, 1997). The reason is that most rural dwellers are farmers who cultivate small farms with inefficient traditional farming tools. Agricultural production is therefore not enough to support the growing population in these communities. A plausible way for developing these rural communities is therefore to improve agricultural practices used by the people through technological improvements and the development of an effective system of training farmers.

The agricultural sector will continue to play an important role in employing a large percentage of the population in Ghana and other developing countries. Röling, Ascroft, and Chege (1978) noted that because of the slow appearance of alternative employment opportunities, more, instead of fewer members of the rapidly growing population must find a living in agriculture, at least for the next several decades.

Improving agricultural production, as recognised by Opio-Odongo (2000), requires training in the knowledge and use of improved farming technologies. If farming as an industry is to be sustained, then technological transfer must not

only involve people who are already farmers, but also young people who are likely and willing to become prospective farmers.

In Ghana, the transfer of agricultural technology to farmers is mainly done by the Ministry of Food and Agriculture (MOFA) through agricultural extension services. Agricultural extension agents (AEAs) are in direct contact with farmers to whom they deliver the technology. Unfortunately, however, majority of the farmers, who are small-scale farmers, receive limited benefit from the direct services of the agricultural extension agents (AEAs). Most AEAs follow the "strategy of least resistance". They select a few pilot or contact farmers who are usually more educated, more innovative and sociometrically advantaged, and work intensively with them. These pilot farmers are, in turn, expected to be agents of diffusion of innovations introduced to them by the AEAs. The farms of these contact farmers are expected to serve as model farms to those other farmers whose farms are in the same location as theirs.

This strategy of extension has been criticised for contributing to the widening of the gap between the advantaged and the less advantaged farmers. Apart from the fact that some farmers are not reached at all, it is known that the quality and accuracy of information passed on to secondary audience are very low (Röling *et. al.*, 1978). Belloncle (1989) described this form of extension practice as a characteristic that profoundly contradicts the values of traditional African society, whose ultimate goal, according to Bureau (1978), is to guard against inequalities. However, the target-group selection principles are considered justified in a situation where the AEA has to make choices because he cannot reach all the overwhelmingly large number of farmers within his area of operation.

According to FAO (1996), there is a shortage of well-trained agricultural extension staff in many developing countries, including Ghana. In a study, the FAO (1990) estimates that the number of economically active farmers in developing countries who receive extension services each year is one in five (20%), and an extension staff-to-farmer ratio of about 1:2000. This has undoubtedly resulted in a poor functioning of the extension system in Ghana and several other developing countries.

From a simplified and logical perspective, a solution to this problem would be the expansion and intensification of agricultural training in the agricultural colleges and farm institutes. The operation of the farm institutes and agricultural colleges are under MOFA, and these seem to concentrate on the development of staff for government services rather than for the agricultural industry. By policy, MOFA is not responsible for the development of prospective farmers. The Ministry of Education and Sports, through its agriculture curricula in schools, colleges and universities, educates young people with the knowledge, skills and attitudes that would challenge them to take up farming and other agriculture-related occupations, and that would also benefit them if they ventured into these occupations. The agricultural science curriculum in the junior secondary school (J.S.S.) for example, has been designed as a pre-vocational programme, which is expected to generate interest in the youth, so that they may decide to pursue agricultural occupations. On the other hand, the agricultural science curricula in the senior secondary school (SSS) and higher levels of education are expected to equip students with the requisite scientific, managerial and operational skills that will enable them farm more efficiently and scientifically to produce better yields.

In reality, however, vocational agriculture is not taught in the schools hence, students lack the necessary skills and attitudes toward farming. As a result, young people are not willing to take up agriculture as a career when they complete school (Blege, 1986; La-Anyane, 1985; Twum-Barima, 1977; Eshuis & deVeth, 1969; Foster, 1965). Farmers' children in Ghana do not return to work in the rural areas when they leave school. The result is that the number of farmers is diminishing while their average age keeps rising. Some writers such as La-Anyane (1985); Twum-Barima (1977) and Foster (1965) have attributed this to the lack of good health and educational facilities, and other social amenities in the rural areas. Farming is also not rewarding enough to attract the youth. From another perspective however, Balogh (1961) attributes the youth's reluctance to take up farming to an educational system, which is dissociated from practical farming. He suggests that the youth can be encouraged to appreciate and choose farming as their occupation when they are taken through real life farming experience as part of their education. Phipps (1972) hints that a person who takes active part in solving a problem naturally develops the attitude of acceptance of information gained, and the desire to carry this information to practical use.

1.2 Statement of the Problem

Separate efforts by the MOFA and MOES to provide training for established farmers and possible prospective farmers respectively for improved agricultural production have not yielded adequate results. The MOFA has not succeeded in changing the agricultural practices of small-scale farmers

significantly through its contingent of AEAs because they are too few and ill-equipped to reach all the farmers. Several farmers will continue to be deprived of extension services if additional 'grassroots' extension support systems are not developed.

The Ministry of Education and Sports has not succeeded in equipping young people with the necessary attitudes and skills that would turn them into productive farmers. There is no linkage between the agricultural science curricula in schools and the transfer of technology in agriculture to farmers. Thus, pupils and teachers in schools are not aware of agricultural innovations being adopted by the local community.

In effect, three major lapses have been identified from these observations:

1. The Ministry of Food and Agriculture alone has not succeeded in transforming the attitudes, skills and practices of practicing farmers and agricultural workers for increased improved agricultural production. This is mainly attributed to the low number of extension personnel responsible for several farmers;
2. The Ministry of Education and Sports on its own has not been able to transform the attitudes, skills and practices of students toward agriculture as a gainful profession. One of the main reasons assigned to this situation is that agriculture in the schools is far remote from the agricultural extension activities in their respective communities; and
3. There is no system designed to link agricultural education offered by AEAs in the community to agriculture

taught in the schools by agricultural science teachers to enable the two systems benefit from each other.

These observations are buttressed by the Vision 2020 Document (Government of Ghana, 1994) which pointed out clearly that there appears to be no coordinated agricultural education policy in Ghana. Agricultural education is taught at all levels of education, but the practical content is very low, and teachers at the lower levels are not adequately trained to teach agriculture practically. The document further pointed to the lack of logistical and in-service training support for the teachers to deliver effective practical agricultural training to their students. A line of action drawn in the Vision 2020 document to address this identified shortcoming includes:

1. A review of the state of agricultural education in the country in order to formulate an agricultural education policy that will guide and coordinate the operations of the MOES, MOFA., followed by a review of the curricula of both formal and non-formal agricultural education at all levels including agricultural extension; and
2. An improvement of agricultural education at all levels to make it more practical to respond to the needs of the industry through substantial investment in upgrading teaching staff (particularly at the lower levels) teaching facilities and demonstration farms.

In spite of these proposals meant to mitigate the observed weaknesses in the performance of both the Ministry of Food and Agriculture and the Ministry of Education and Sports, neither of the two institutions has developed workable operational linkages between them to serve as support systems for each other

regarding agricultural education. Moreover, the two ministries do not utilise the rich resources of each other in their closely related missions to train practising and prospective agricultural workers. There is no occupational interaction between AEAs and agricultural science teachers that could lead to exchange of ideas and information between them.

The mutual co-dependence of the two ministries through a linkage system between agricultural extension and school agricultural education promises to yield significant benefits to both ministries. A study to investigate the feasibility of a system that would provide a school-based support for the current extension system while at the same time serving as a teaching lab for agricultural science teaching in the junior and senior secondary schools is therefore a necessity.

1.3 Objectives of the Study

1.3.1 General Objective

The main objective of this study was to examine the prospect for establishing an agricultural extension support system, which is based on the linkage between the programmes of AEAs and the curricula of junior secondary schools and senior secondary schools.

1.3.2 Specific Objectives

In examining the prospect of developing a school-based extension support system, in either the JSS or SSS, the following specific objectives were pursued:

1. Determine the perception of farmers, agricultural extension agents (AEAs), DDOs, JSS and SSS heads and agricultural science teachers on the prospect for using the school as a centre for diffusing agricultural technology,
2. Determine the factors and conditions that are considered as important in the use of JSS or SSS as centres for agricultural extension support system, as perceived by farmers, AEAs, DDOs, JSS and SSS headmasters and agricultural science teachers.
3. Find the perceived input requirement, in terms of training, equipment, and modifications that have to be made in the school curriculum to make room for the extension support system
4. Find the perceived linkage levels among agricultural science teachers, AEAs and farmers in the farming communities.
5. Identify the important factors in the motivation of agricultural science teachers and agricultural extension agents to support extra-duty activities.
6. Determine the strengths, opportunities, weaknesses and constraints for SBESS in the JSS and SSS by SWOC analysis based on the perceived availability and levels of the identified factors.
7. Conduct a force field analysis to establish the prospect for the establishment of SBESS in the JSS and SSS.
8. Find the roles of teachers, heads of schools, students, AEAs and farmers in the extension support system as perceived by heads of schools, AEAs, farmers, and agricultural science teachers.
9. Develop a framework for SBESS at the appropriate educational levels.

1.4 Research Questions

The study sought to find answers to the following research questions:

1. How do farmers, agricultural extension agents (AEAs), district agricultural development officers (DDOs), JSS headmasters, JSS agricultural science teachers, SSS headmasters and SSS agricultural science teachers, perceive the use of JSS and SSS as centres for agricultural extension support system?
2. What are the factors and conditions that are considered as important in the use of JSS and SSS as centres for agricultural extension support system, as perceived by farmers, agricultural extension agents (AEAs) and agricultural science teachers in the JSS and SSS?
3. What are the perceived input requirement, in terms of training, equipment, and modifications that have to be made in the school curriculum to make room for extension support system?
4. What are the linkage levels among agricultural science teachers, AEAs and farmers in the farming communities?
5. What are the factors that influence the motivation of teachers and agricultural extension agents to support extra-duty activities?
6. What are the strengths and opportunities, weaknesses and constraints for SBESS in the SSS and JSS as perceived by respondents?
7. What is the prospect level of SBESS as indicated by force field analysis of the assessment by each respondent category?
8. What are the expected roles of each category of relevant participant in SBESS?

In developing a framework for the school-based extension support system, the following inputs were taken into account using:

i) Objectives of the system;

ii) The role of AEAs of MOFA;

iii) The role of MOE and G.E.S;

iv) The role of agricultural science teachers;

v) The role of students;

vi) Time frame for interaction between agricultural extension staff and the school, considering the school timetable;

vii) Curricular concerns in the school;

viii) Reward systems for stakeholders;

ix) Allocation and use of resources;

x) Methodology/strategy of implementation;

xi) Monitoring, evaluation and feedback mechanisms; and

xii) Reality and feasibility of all roles and activities.

1.5 Justification of the Study

Weaknesses in the agricultural extension system contribute significantly toward the low agricultural production levels in the country. The study was designed to identify some of these weaknesses for correction by the MOFA.

The study outcome was meant to initiate a process that would be capable of linking extension services to agricultural education in schools. Although the need for an operational linkage between the agricultural extension system and the

agricultural education systems in Ghana has been recognised, there is lack of evidence on its feasibility. There is also no direction on how it can be practically put in place. It is expected that information on the prospect of a school-based extension support system will generate interest and enthusiasm on establishing linkages between extension and school agriculture. A framework for an extension support system, which would be one of the outcomes of the study, is expected to be a guide to MOFA and MOES authorities on how to develop collaborative systems between their respective ministries and institutions.

Gobeli (1996) believes that young people can develop the skills and knowledge to work as partners with adults in their community to determine critical issues and responses to solving community problems. The school-based extension support system envisaged in the study has the potential of creating awareness and concern in students about agricultural technologies being adopted in their community. The community of farmers, in turn, would be offered an opportunity to realise the relevance of the school not only as a place for providing theoretical knowledge to children, but also as a place for finding solutions to their farming problems.

Thirtle and Ruttan (1987) noted that the level of productivity achieved by farmers in developing countries falls far below that found in the developed countries because the developing countries have not made adequate investments on those physical and institutional infrastructure necessary for realising their productivity potential opened by advances in technology. They identified the institutional elements that interact in the development and adoption of technology as: research and extension, education, land, labour and capital, land tenure,

agricultural institutions for credit, cooperation, marketing and pricing policies. The study would unearth one major educational facility that can be utilized in rural farming communities to improve agricultural productivity. This was conceptualized in the study as the school-based extension support system (SBESS). The system provides an operational means for linking the agricultural educational activities of MOFA and MOES, and an economical utilisation of the physical and human resources within both ministries to benefit farmers and students. This will also serve as an easy means for making agriculture real to students, and thus, has the potential to increase the confidence and interest of school-going youth in agriculture.

The method of analysis adapted in this study would open up discussions and use of systemic analysis of scientific data, which has been shunned by the majority of mainstream scientists and researchers for several reasons. Prominent among these reasons are the lack of knowledge about systems analysis, the absence of prototypes to serve as guidelines to new researchers, the difficulties presented by the voluminous information required to make adequately justified conclusions, and the volume of work involved in defining all of the variables in purposeful activity (Bawden, Macadam, Packham, and Valentine, 1984). However, the entire world and its constituents operate as systems that cannot be adequately understood by logical and statistical inference. It is therefore important to begin investigating agricultural systems using systemic approaches. This study would provide a prototype for agricultural systems analysis. Systems analysis has gained a number of adherents over the past few years and models have been developed to optimize strategies for such agricultural functions as rotational grazing (Morley, 1968);

Noy-Meir, 1976), irrigation water application (Cull et al., 1981), fertilization rates (Bawden & Bennet, 1974; Heylar & Godden, 1977) and pest management programmes (Teny, Blackie & Close, 1978)

According to Cary (1998) the process of adopting information offers insight into the methods, media and timing that can be used to effect change. Some educational processes promote new ideas and encourage adoption. While specific methods and media vary among cultures, the same principles can serve as the basis for looking at other situations and identify permanent methods and media for each stage of adoption. The idea of SBESS therefore can be used as the foundation for expanding the role of JSS and SSS agriculture in the development and spread of agricultural innovations, especially in rural communities.

The study is also necessary to identify the various characteristics of extension workers and teachers that enhance or obstruct cooperative training of present and future farmers. It would reveal the appropriate point in education where an extension intervention in schools has the greatest benefits for farmers and students. This is a source of information for formulating appropriate policies on linkages between agricultural extension and formal educational activities that will facilitate the learning of practical agriculture in schools, as well as provide a base for an extension support system in the school. Besides agricultural extension, the model can be applied in other extension efforts, including community health educational programmes.

Agricultural activities of schools in the rural community can serve as a model of technology use to farmers. For example, Durston (1996) stated that the most successful efforts to reform rural education are to develop "new schools"

that instead of extracting the youth from their environment would rather extend information and knowledge from the schools to the communities. This creates a necessity for coordination between reform-minded education ministries and agriculture ministries for pursuing progress and updating their strategies and approaches in order to achieve rural development as well as education of the youth. This study aimed at finding a means by which pre-tertiary school agriculture can be linked with the activities and programmes of the local Agricultural Extension Agent and technology transfer, so as to make agriculture as real to the young student as possible. The framework that has been developed from the study for a school-based extension support system can be used to develop an efficient and cost-effective extension support system that will reach most small-scale farmers and also involve young people in the business of agriculture. It can also serve as a model for designing similar systems for collaborative human resource development in other sectors of the economy between community members and public or private institutions.

1.6 Scope of the Study

The study covered rural areas of Central Region where farming is the main occupation of the people. It ensured that location-related biases were eliminated as much as possible through the use of appropriate probability sampling procedures. All junior secondary schools were eligible for the study because they were all offering the same subjects, including agricultural science at the time of data collection. However, Cape Coast Municipality was isolated from the study

because the study was focused on rural farming communities. Over 80 percent of the JSS in the municipality are located in urban communities.

The study also covered only senior secondary schools that were offering Elective Agriculture as a subject. These were the only SSS in which agriculture was actually taught as a course with practical lessons. Other senior secondary schools were offering agricultural science as an integral part of Integrated Science.

1.7 Limitations

The study, like most systems research, relies largely on respondents perceptions, which do not have guaranteed level of accuracy. However, the results can be considered as dependable, based on the satisfactorily high level of internal consistency of responses offered by the respondents. Also, perceptions change with time and context. Therefore, the time lapse between the field data collection and the write-up are likely to generate some differences. Changes in educational and agricultural policies are, however, rather slow and, therefore, the environment of the study can be considered to be stable, thus making the results applicable over a considerable period. Limitations imposed by time and resource constraints were offset by delimiting the study to the Central Region.

1.8 Delimitations

The study, using the survey format, was confined to the Central Region of Ghana, where the University of Cape Coast is located. The application of the

study results to the Region has the potential to generate interest in research into its applicability to other regions and other countries.

1.9 Definition of Terms

Constraint: Any external factor of SBESS rated by participants as lower than average

Driving forces: All factors, strengths and opportunities that are found to favour the prospect for SBESS

Envisioning alternative futures: An adaptation of an input-transformation-output process that would lead to the creation of an improved situation of extension-school linkage for farmer education.

Factor strength: The degree to which a factor is perceived by respondents to influence SBESS.

Force field analysis: A mathematical/graphical analysis of balance between driving forces and restraining forces to determine the possible chances for occurrence or otherwise of an event.

Motivation: The inner force that drives individuals to accomplish personal and organizational goals.

Opportunity: Any external factor of SBESS that is rated by participants as greater than average

Prospect: The chances for the existence and sustenance of a programme or system.

Prospect Strength Index: The mathematical rating of SBESS indicating the degree to which respondents perceive the possibility of its existence.

Relevant participants: Categories of persons that were identified to have active roles to play in SBESS planning and implementation.

Restraining forces: All factors, weaknesses and constraints that are found to frustrate the prospect for SBESS

School-based extension support system: An arrangement in which an extension agent, with the assistance of school agricultural science teachers, uses the school farm as the centre for demonstration of agricultural technologies to both farmers and students.

Strength: Any inherent characteristic of SBESS that has an average rating of greater than 3 by respondents

Weakness: Any inherent characteristic of SBESS that has an average rating lower than 3 by respondents.

1.10 Outline of Thesis

The thesis is laid out in five chapters, the first of which gives the background and the statement of the problem, the objectives, and the justification of the study. The limitations and delimitations of the study are also outlined in the first chapter. Chapter Two comprises a discussion of literature related to the studies that serve as basis and guidelines to the methodology used, and discussions of the results. The third chapter describes the methodology used in the study for data collection and analysis. The results derived in the study are presented and discussed in Chapter Four. Finally, in Chapter Five, the summary of the findings, the conclusions drawn from them and appropriate recommendations are provided

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

There is no doubt that the application of basic science and technology to production is a fundamental means by which agricultural production can efficiently be increased to cope with the growing population in Africa. Carter (1991) disclosed at a workshop on Africa's agricultural development that high yields regularly obtained by American farmers is not so much from mechanisation as from the application of basic science and technology. This has led to better varieties, improved soil fertility, and new knowledge about crop and animal development. Also, Röling & Pretty (1997) noted that a necessary condition for a sustainable agriculture is that large numbers of farming households must be motivated to use coordinated resource management. The role of agricultural extension is vital to the diffusion of new technologies. But according to the Government of Malawi (2000), extension is currently failing, or is moribund (Eicher, 2001) in many African countries. Reasons assigned to this condition indicate that extension staff are bloated, under-trained, not mobile, and therefore not proactive. There is also little, if any, coordination between extension and research, and even less between extension and agricultural higher education. This requires that an agricultural extension approach that will ensure that as many farmers are reached as quickly as possible is needed in the agricultural

development efforts of nations (Rivera, 2001).

This literature review covers various concepts, factors and conditions that have played various roles in developing appropriate extension delivery systems to suit different times and situations. Some extension approaches and their main foci and deficiencies have been described in the literature to guide the definition and conceptualization of the school-based extension support system. Literature on the systems approach to analyzing agricultural problems and taking decisions concerning farming and education has also been reviewed to provide a theoretical framework for the analytical approach used in this study.

2.2 The Conceptual Framework: The Envisioned School- Based Extension Support System

The conceptualisation of school-based support system was derived through envisioning alternative futures. This is a systems technique for imagining alternatives described in the conceptual framework of the study.

In the envisaged school-based extension support system, the basic idea is the use of school farms as demonstration sites by agricultural extension agents (AEAs) for communicating agricultural innovations and technologies to their clientele farmers. The school farm will also remain as the main facility for training students in practical agriculture as part of the school curriculum. Planning and preparation of demonstrations will involve agricultural science teachers and students in the schools that serve as the base. The preparation of demonstration plots using the innovative technologies will serve as practical lessons for students. Farmers

will be expected to visit the school farms regularly to acquaint themselves with new technologies. Practical lessons for students are planned by both agricultural science teachers and the extension agents. A conceptual model of the system linking the school and extension is shown in figure 1.

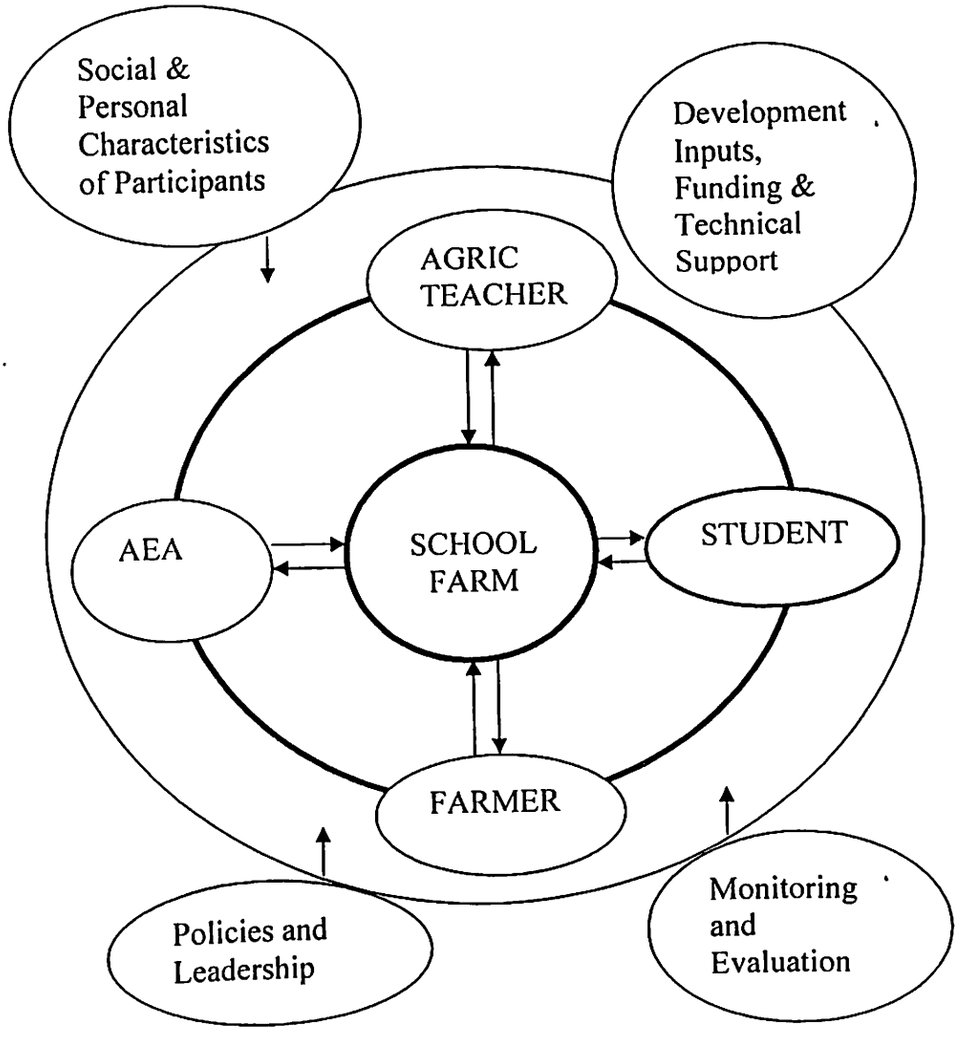


Figure 1. A Conceptual Model of the School-based Extension Support System (SBESS) *Source: Author (2005)*

The conceptual model of the school-based extension support system (SBESS) is a modified adaptation of Bawden's (1991) conceptualisation of a farm as a system. The model presents the various components of the SBESS, and their relationships and linkages. At the center of the entire concept is the school farm in a farming community, which is normally used by the agricultural science teacher for teaching practical agriculture to students in the JSS or SSS. In the model, the agricultural science teacher in the community school join hands with the agricultural extension agent responsible for the community to plan, develop and use the school farm as a resource for communicating agricultural technologies to students and farmers. The students benefit from the services of the AEA through the use of the school farm. The AEA uses the school farm as the demonstration site for improved agricultural practices and technologies. Farmers therefore have the opportunity to visit the school farm and use it as a learning facility. The farmers benefit from the services of the agricultural science teacher through the school farm demonstrations. The school farm also offers farmers and students the opportunity to learn improved agricultural practices together and discuss common problems related to agriculture. Teachers and AEAs, on the other hand, receive feedback signals from the students and farmers to study further, seek more information, plan research activities, and develop the school farm to meet the needs of their clients. Their experiences and skills will complement each other's performance in their respective responsibilities. All the identified categories of participants directly and indirectly perform various roles that contribute to the development of the school farm.

The sustainability of the system will be strengthened or constrained by the flow of development inputs, funding and technical assistance, and the personal and social characteristics of the individual participants in the system. It is also influenced by the educational and extension policies as well as the leadership structure.

The constraining factors were identified in the study and a change strategy was recommended for mitigating them. An examination of the prospect for such a system in junior secondary schools and senior secondary schools was the purpose for this study.

2.3 Conceptualisation of Extension

The development and design of any extension support system must derive its roots from the way agricultural extension is conceptualized by the categories of people who participate in and benefit from extension, and in the policy guiding extension practice in the country concerned. Extension has been conceptualised in various forms by several analysts and critics in the past few decades. Van den Ban & Hawkins (1996) conceived extension as the conscious use of communication of information to help people form sound opinions and make good decisions. Extension as a process and activity initially did not concern itself with agricultural activities. However, Adams (1988) observed that extension featured four basic elements, which are common to modern agricultural programmes:

i. The knowledge to be extended;

ii. The people to be served;

iii. The central extension organisation; and

iv. The extension agent, i.e. the contact man or woman.

According to Röling (1990), the concept, the term and the usage of extension is neither handy nor precise because they differ from country to country. For example, in the United Kingdom, Germany, and Scandinavian countries, the focus of extension is on advisory work, on solving specific problems. In the American tradition, however, extension is used to mean an educational activity that seeks to teach people how to solve problems by "extending" information.

Agricultural extension, as a terminology, evolved in the United States of America to describe a non-formal education for farmers in the farming communities (Adams, 1988). This form of non-formal education, according to Buford, Bedeian, & Lindner (1995) was directed at training farmers to access productivity enhancing technologies, practices and inputs. The objectives of agricultural extension in Ghana, as outlined by the Ministry of Food and Agriculture (MOFA) (1997) under the Unified Agricultural Extension System (UAES), includes collaboration with the Junior and Senior Secondary schools in order to exchange views and ideas and collectively assist in the agricultural development in the locality. This objective points to the relevance of a school-based extension system that is capable of realizing this vision in a systemic manner. The conservative view of extension portrays it as an instrument for helping farmers to make well-considered decisions and choices among alternatives, which are provided by extension agents. The emphasis here is supporting the individual to make the best decisions needed to achieve his/her personal goals. The individual is seen as free to use or not use the extension information. The

Christian and socialist traditions consider extension as an instrument for emancipation and upliftment of the poor – a pedagogy of the oppressed (Freire, 1973). In Ghana and several developing countries, agricultural extension is used by the government mainly for non-formal education in agriculture, but also for addressing important social issues such as HIV/AIDS prevention, child abuse, health drug abuse, birth control, environmental degradation, etc.

Conceptualization of extension as a mere process of transmitting information and skills is fast losing grounds in contemporary agriculture. Freire(1973) noted that agricultural extension agents are no longer to be considered as mere transmitters of technical knowledge; they are to practise participatory meetings, recognize and report gender issues, identify indigenous needs and solutions to problems, and serve as links to the world outside the farming village. There have been several reactions against the top-down implications of some definitions of agricultural extension. Buford, Bedeian, & Lindner (1995) stated that generally, agricultural extension aims at attaining the following:

i. Teaching farmers and rural communities how to identify and assess their needs and problems;
ii. Helping farmers acquire the knowledge and skills needed to cope with their problems; and
iii. Inspiring farmers to actions that will improve the qualities of their lives.

In their conclusion, they noted that agricultural extension focuses on helping farmers to convince themselves of the benefits of scientific information, new technologies, improved practices and alternative approaches to solving problems, or managing their own affairs. Hawkins (1974) indicates that agricultural

extension links farmers to research based and tested techniques, practices and inputs that are expected to be of benefit to them. Differences in terminology developing around agricultural extension, in the view of Röling (1990), are the only source of confusion regarding the concept 'extension'. In reality, agricultural extension is expected to achieve different purposes in accordance with the policy or tradition within which it functions. Thus the ordinary farmer will conceptualise agricultural extension in the manner that he/she sees it operate and the outcome thereof within this/her community.

2.4 Extension Approaches in Ghana

2.4.1. The Training & Visit (T&V) System

The existing agricultural extension operating in Ghana is the Training and Visit (T&V) system. The T&V system of extension has become about the most popular and the most funded system in Africa in recent times (Cleaver, 1994), and has proven to be the most important method for productively integrating the collaborative efforts between research, extension agents and producers (Sene, 1995). Benor & Baxter, (1984) consider the T&V system as an effective management model that enables an efficient implementation of known extension principles.

The system's main method is that agricultural extension agents (AEAs) are given regular monthly or fortnightly training on skills and knowledge, which they intend to impart to farmers. They, in turn, transfer the technology to contact farmers or farmer groups they select in the community. These contact farmers

are expected to diffuse the technology to the other farmers who are "less progressive". Thus, the basis for the T&V system is the diffusion theory (Rogers, 1983). Basically, the T&V is a top-down approach that involves the transfer of technology from the researcher, to agricultural extension agents, and then to farmers. The success of the system, according to Axinn (1988), is measured in terms of production increases of the particular crops covered by the programme. However, agricultural extension agents are also expected to discuss with farmers, their technological needs and problems, and present them to their Subject Matter Specialists (SMS) and researchers for remedial approaches to be found and communicated back to farmers.

Important successes have been reported from the adaptation of the T&V system in Burkina Fasso, (Venkatesan,1995) Kenya, and several other African and Asian developing countries. Among other successes, Benor & Baxter (1984) identified that the introduction of the T&V system has been associated with impressive increases in agricultural production. It is also seen as a cost-saving approach, by which method, large extension organisations could be mobilised at a small recurrent cost. By means of continual on-the–job training, T&V upgrades the calibre of extension agents, and also increases contact between the extension agents and farmers. In the view of Belloncle (1989), it mobilises the relevant results derived locally for participatory farming systems, because it has the ability to organise public servants for broad dissemination of information. As a result of these benefits, about forty nations in Eastern and Western Africa, Europe, South and South-East Asia, Middle East, and, South and Central America have taken up the system at national and local levels.

These successes, notwithstanding, Gubbels (1995) states that one of the most intractable problems in transforming agricultural extension lies in developing institutionally viable ways of working with small farmers. The benefits of the T&V system are seriously hampered by the woefully small numbers of extension workers relative to the huge numbers of farmers in the rural areas (Chung, 1991). Beaudoux (1995) criticizes the T&V system for not taking into account the different types of agricultural practice and the need for diverse solutions to diverse problems. There is ample evidence to show that the so-called innovators in the T&V system have more land and other physical resources at their disposal than the other farmers in their group. They also have more contact with a range of information sources. Farmers at the extremely deprived end are regarded as the laggards (Rogers, 1983). These farmers tend to lack confidence and enough security to take the risks associated with adopting a new technology.

2.4.2 Other Approaches.

An attempt to solve the problem of ineffective extension has led to the adoption of several categorisations of approaches to extension most of which have been used in Ghana under various conditions. For example, before the introduction of the Unified Extension system the Cocoa Services Division was using the commodity-based approach which facilitates the production of dominant cash crops. Pickering (1989) categorised into five, various approaches that have been used in West Africa with varying degrees of success. These are:

1. The commodity-based approach which facilitates the production of dominant cash crops such as cocoa and coffee.

2. Community development – cum-extension, in which the extension worker is involved in several community development activities, including agricultural extension.
3. Innovation centered approach in which the primary function is to transfer to farmers, technology from outside their sociometric context. It tends to present ready-made packaged innovations to the farmers.
4. Farmer-centered approach that puts the emphasis on technology diffusion through the training farmer and farmers' ability to influence each other. programme planning is based on farmers' needs and constraints. The approach is exemplified by the Training and Visit (T& V) system.
5. Village Associations approach, which use cooperatives and other village groups as the main basis.

Axinn (1988) produced a guide on alternative extension approaches which distinguished between eight different approaches, most of which, according to Rivera (2001) have been supported by FAO at various times in different countries. The categories were:

1. The general agricultural extension approach. Success in this approach is measured by the rate of take-off of recommendations and increases in national production;.
2. The commodity specialized approach whose measure of success is usually the total production of the particular crop;
3. The training and visit (T&V) approach. Success is measured by the increases in the total production of the particular crop;
4. The agricultural extension participatory approach, whose

success is determined by the numbers of farmers actively participating and benefiting, and the continuity of the local extension organizations;

5. The project approach, whose success is measured by short-run changes in the agricultural system;
6. The farming systems development approach. Success of the approach is determined by the extent to which farmers adopt technologies developed by the programme and continue using them over time;
7. The cost-sharing approach. Success is determined in terms of farmers' willingness and ability to share some of the cost of innovations either individually, as groups, or through their local government units; and
8. The educational institution approach. The measure of success is the farmers' attendance and participation in the school's agricultural extension activities.

From the categorizations above, SBESS falls in the educational institution approach as described by Axinn (1988). This study centers on designing the kind of institutional extension programme that will adequately support other extension systems dominantly operating in the farming communities of the Central Region of Ghana.

2.5 Factors that Influence the Change Process in Extension Systems

A common observation in Ghana is that the various agricultural extension systems that have been used go through several reviews and changes because the processes of change in agriculture are usually very slow, especially in rural communities.

Several factors have been perceived to be associated with this slow pace of change in agricultural practice through the various extension systems. These include access to technology, farmer groups, characteristics and culture of the community, characteristics of the individuals in the extension–farmer communication processes, extension agent qualities, and motivation of stakeholders.

2.5.1 Access to Technology.

Rivera (2001) notes that in addition to technology transfer, agricultural and rural extension is a unique service in that it offers small-scale farmers and rural poor living far from urban centers, access to non-formal education and information services. He notes that while extension can provide these services to increase their productivity, their food security will depend on institutional developments and income generation, together with increased food crop output. Röling et. al (1978) noted that times have changed, replacing traditional tribesmen and isolated villagers as the main audience for diffusion programmes, with masses of small-holder farmers. The major bottleneck in development for these new sets of farmers is the lack of opportunities for change rather than their resistance to change. Thus, the problem facing the majority of small-scale farmers is that they do not have effective means of receiving information and training in basic science and technology, which they badly need. According to Cleaver (1994), the low level of agricultural production in African farms is, undoubtedly, due to the use of inappropriate farming technology. This is reflected in the key premise underlying the Sasakawa Global 2000 projects in Africa, which assumes that a large reservoir of technologies are already available in Africa, but have not reached the farmers,

especially small-scale producers (Gubbels, 1995). However, FAO (1997) has expressed optimism on the feasibility of increasing farm output by small-scale farmers in low-income food-deficit countries (often using quite simple and low-cost technologies).

The blame for the distance between several farmers and technological innovations is often placed on the ineffectiveness of extension methods. Dowswell & Russell (1991) point out that failure of technologies to reach farmers is the result of ineffective technology transfer models and bad pricing policies of governments. Ineffective extension was also blamed for the inability of National Agricultural Research Systems to produce enough relevant technologies for farmers (Venkatesan,1995). This lack of access to technological information undoubtedly is more acute in the Ghanaian schools where students do not have the opportunity to experience real life application of agricultural theories and technologies in the field. According to Heal (1973), agricultural policy planners are often under the assumption that technical progress occurs at an exogenously determined rate, and that no effort need to be expended to produce it. As a result developing countries, rather than carrying out their own research and development activities, borrow the existing technologies of the developed countries. Dowswell & Russell (1991), therefore, stress that it is important to mobilise resources for effective extension and resolve problems in technology transfer systems being felt among government officials, international development organisations and agricultural development organisations. Agricultural development cannot be achieved in Africa unless farmers have greater access to the products of science-based agriculture.

2.5.2 Farmer Groups

The importance of clientele groups in agricultural extension has been identified by several extension workers and experts. As an illustration of the value of farmer groups in cost effective extension delivery, Sasakawa Global 2000 (SG2000) emphasized group formation and cooperation among beneficiary farmers in several countries in Africa in its food security programmes. However, according to Newby (1987), the rural community exists as an occupational community, in which relationships, established at work, spill over to leisure hours. Farmers in the village community are held together as a natural group by the strong kinship links among them and the need for cooperation in times of family crisis (Francis & Henderson, 1992). Despite these links, formal group formation usually becomes relevant and necessary for focused action relating to specific agricultural problems. However, it often appears to be problematic to rural development workers. Knipscheer, Zinnah and Mutimba (2002) have expressed that farmer organizations that are able, motivated and sufficiently independent to effectively represent farmers' interests are indispensable in protecting and enhancing the small-holder agricultural system. In such a decentralised extension support system as SBESS, therefore, there is the need to have stronger and more formal farmers' organisations that can manage the system in collaboration with other stakeholders. The low number of agricultural extension workers relative to the number of farmers who require their services necessitates the formation of special farmer groups with which the extension workers implement most of their programmes. The definition of group, as given by Kwarteng (2002), is a number of people who associate on regular basis and seek to achieve common goals and objectives.

This implies that members of a farmers' group, intended for an agricultural extension programme, must share a feeling of unity and common purpose, and must be bound together in relatively stable patterns of social interaction.

The importance of a farmers' group becomes very prominent when it becomes the principal instrument for organizing and executing essential tasks of an institution (the Ministry of Food and Agriculture in this instance). Kwarteng (2002) outlines the following benefits of groups in agricultural extension and other rural development efforts:

1. Groups satisfy the need to be associated with people having common interests;
2. Groups enhance the feeing of security among members. Members of a group are able to bear the risks involved in adopting a particular innovation more than an individual can afford. This is as a result of a feeling of greater security in their united front;
3. Groups enhance the social status of members. Usually, the achievement of an individual in a group tends to reflect the credibility of other members in the group. If the National Best Farmer comes from a particular farmers' group, that groups gains some degree of respect that covers all the other members;
4. Group members are better disposed to look for opportunities and alternatives to solve their problems than individuals. Discussions, brainstorming, consultations and arguments which often occur among group members contribute to the development of more sustainable alternative solutions to problems. It is often said that "two heads

are better than one." In fact, Moore (1987) stressed that if one properly combines the judgments of a large number of people, one has a better chance of getting closer to the truth; and

5. Being in groups also offers members the opportunity to seek help, and help others, with ideas, finance and resources and moral support.

Looking at a group from the psychological angle, Rooks (1987) noted that it was an effective means for avoiding boredom and loneliness. Thus, it contributes to the feeling of wellbeing within the individual.

For the purpose of agricultural extension, groups may be classified into primary and secondary groups, or as formal and informal groups (Kruegar, 1988). Primary groups are small in size, and have greater personal interrelationships among the members. There is such an amount of face-to-face communication among members that strong senses of loyalty, we-feeling and belonging exist within the group. This tends to create a permanent relationship, as seen in both the extended and close family systems. On the other hand, secondary groups are larger in size and are more impersonal. They are more formal with less face-to-face communication. These groups are characterized by the definition of roles and rules. Informal groups do not have definite rules and roles assigned to members. The use of farmers' groups in agricultural extension is increasingly gaining popularity. Farmers' groups consist of groups mainly made up of farmers in a given community. Sometimes it engulfs the entire community, especially, where the community is made up of mainly settler farmers. According to Kumar (1987), several types of farmers' groups exist for carrying out agricultural activities in different sizes, and for different purposes.

Groups found in Ghana include credit groups, food growers associations, agriculture and food processing groups, livestock owners associations, input dealers associations, etc. (MOFA, 2002). Some of the major purposes for forming such groups, according to Chambers, Pacey and Thrupp (1989), include the building of interaction and communication between extension workers and agricultural producers, eliciting and exchanging information from farmer to farmer, facilitating the analysis of farmers' problems and needs by farmers and extension workers together, reinforcing and fostering farmers' own knowledge and capacity, enabling farmers to choose, design and conduct monitoring and evaluation of programmes relating to them, creation of avenues for farmer-to-farmer extension, and empowerment of farmers by enabling them to organize for action or to share resources. Baker and Knipscheer (1987) recognized the importance of farmers group in providing information and insight in the identification of the most limiting constraints of a livestock project in North-East Brazil. Farmers groups were formed to address social social problems affecting agriculture, rather than using individual respondents.

The economic and social reasons for farmers forming small farmer groups were studied by the FAO (1999), and it was found that the small groups generate significant economic benefits to members. As the group reaches a certain level of maturity and self-dependence, people begin to see the limits of small group action and additional benefits that might accrue to them through some form of inter-group cooperation, particularly in gaining access to extension services, input supply and marketing avenues.

Initially, groups appear to be formed based on a variety of issues like handling of credit delivery and repayment, facilitating information exchange among members and between groups, settling disputes and differences, collective purchases of inputs, and others. However, FAO (1999) found that focusing on a few issues initially allows small farmer group leaders the opportunity to polish their leadership skills and assess their progress using the attainment of the group objectives as their criteria. The presence of farmers' groups in the communities where SBESS would be based would be an advantage for effective exchange of information, cooperation among farmers, collective responsibility towards SBESS facilities and activities, and easy accessibility to farmers.

2.5.3 Community Cultural Characteristics as a Factor of the Change Process

The main root of the forces that operate within the environment of any agricultural programme in the rural community is the cultural characteristics of the communities and the people in them. These characteristics may be put into three concepts:

1. Conservatism, which is explained as low expectation, slow adjustment to change, and limited experience of collective action. It is explained by complex historical and social forces (Newby, 1977). Resistance to change permeates many facets of rural life, including attitudes toward voluntary organisations. Williams (1984) illustrated a type of this conservatism in an analysis of local government response to six rural development research projects in England from 1977 to 1979. The conservatism of rural

people necessitates the use of radical and systemic approaches in bringing about changes in their indigenous technologies.

2. Self-sufficiency and self-help: Self-help determinations have often overridden obstacles and disappointments placed in the way of rural communities. Alongside this primary self-help, goes a capacity to raise funds. The small population sometimes limits the extent of ingenuity (Gsänger, 1994). It may be necessary, therefore, to introduce some appropriate innovative technologies to trigger off modifications in rural life.
3. Minorities' attitudes and power: One product of conservatism and self-help ethos of the rural society, is the role of different categories of people within the community (Gsänger, 1994). In most cases, roles in terms of gender, age, traditional status, and wealth are so fixed in the rural community that it becomes extremely difficult to involve certain categories of people in certain project activities. All these are complex issues that need to be treated appropriately to foster agricultural development. Bawden (1995) stated that in order to deal with such complex issues of contemporary agriculture and rural development, we need methods of enquiry that can accommodate the totality of the issues being investigated. They were referring to a systems approach, which contrasts with the conventional approaches in agricultural science based on reductionism.

For a considerable period of time, agricultural extension practitioners assumed that agriculture was a separate activity carried out, decided by an individual, who is the farmer, and grounded primarily in rational technical and economic

considerations. In the last few decades however, according to Leeuwis (2001), these assumptions are seriously flawed, especially in peasant economies. For many farming families, agriculture is only one of the integrated income generating activities, implying that agricultural practices can only be understood in the context of practices in apparently non-agricultural domains (Hebinck & Ruben, 1998; Farrington, Carney, Ashley & Turton, 1999; Ellis, 2000).

Gorton(1980) suggests that it is essential for the change agent to develop an understanding, commitment, and possibly new attitudes and skills that are appropriate for dealing with those individuals and groups who will be most affected by an innovation. In SBESS, groups or individuals that will be most affected will be farmers, teachers and students, as well as the change agent themselves. The same people are also likely to represent the greatest sources of potential support or resistance to the proposed innovation.

2.5.4 Participant Characteristics as a Factor of the Change Process

The participants in every change process are one of the major determinants of the success or otherwise of that process. Their influence is derived from their personal characteristics. The participant characteristics that most importantly influence the change process depend on the kind of change and the processes concerned. People with different personal characteristics differ in their needs, abilities to participate in various activities involved in the change process, and even in their perception of the components of the change process. Therefore, people's age, work experience, and educational background can be expected to have effect on their ability to participate the activities in SBESS.

The influence of years of working experience on the needs, perceptions and performance of individuals in their occupations and participation in various activities has been reported by several researchers. A study by Celis (1971) showed that Mexican extension workers with less than three years working experience expressed greater need for technical information, while those who had worked for more than three years expressed greater need for information on social issues and agricultural extension methods. This illustrates the influence of work experience on participants' information and training needs. Similarly, Sabihi (1978) discovered that specialists who had more experience perceived less need for extension philosophy, organisation and administration. This logically derives from the fact that such people have obviously gathered practical experiences from the various positions they might have held in the course of their service period and their operations. Any new extension support system must therefore examine and consider the variations in various participants' needs with respect to variations in work experiences.

Performance of participants is also influenced by the work experience of participants or workers. Schmidt, Hunter, Quterbridge & Goff (1988) noted that the amount or length of working experience affects performance independently of ability. Also, Scrank & Waring (1983), working on the influence of age on participants' performance, stated that age and years of working on a particular job are rough indexes of knowledge and experience. Workers with many years of job experience were found o be more likely to break new grounds in their job performance than workers with just a few years of working experience.

Budke & Paddie (1994) found that supervisors who had held their positions for longer years tend to generate less extra effort and satisfaction from their subordinates. Thus, subordinates tend to relax or work with less satisfaction as the same continues to be their supervisor for a long period. It is difficult to infer from this finding whether it would be advisable to maintain the same agricultural science teacher and AEA as facilitators in a school-based extension support system for a long time, without causing a decline in the interest, enthusiasm and satisfaction of the other relevant participants.

Age has also been found to have significant influence on the performance of participants in the change process. Pelmutter & Hall (1992) declared that older workers are more productive than younger workers, and that declines in time and speed are usually compensated by older workers' superior flexibility, creativity and experience. In introducing the school-based extension support system (SBESS), however, the progress and performance of farmers, who will be logically older than students, would have to be monitored carefully to ensure that they benefit from those advantageous attributes.

The level of formal education has also been found to be an important characteristic influencing farmers' participation and acceptance in any programme. According to Brynes & Brynes (1978) a farmer's level of education, to some extent, determines the types of tasks he/she is capable of undertaking in any programme, and therefore, his/her level of participation. Farmers with low education, therefore, require greater extension efforts to attract them to participate in innovative programmes and help them accept and use improved technologies. Education, according to Gordon (1976) affords the farmer the opportunity to pry

for more information on new technologies and to better understand and be more receptive to advice from extension agents. These are usually achieved through the ability to read about new technologies printed in bulletins and try them while others observe and follow.

According to the findings of Cernea (1991), a farmer with a higher level of education is expected to be able to participate more in extension programmes than one with lower level of education. Therefore in communities where farmer education is generally high, SBESS is more likely to receive greater and more active participation that where farmers are less educated. Chung (1991) has noted that literacy level among farmers is highly correlated with the utilisation of modern technology. Therefore, efforts to raise agricultural production in Zimbabwe have been partly concentrated on providing the youth in school with the needed knowledge and skills that are closely linked with existing realities in farming.

Schoolteacher characteristics are of major importance in the case of SBESS. Generally, school teachers are not so comfortable with teaching adults such as farmers, as they are with younger people. Findlay & Drake (1989) observed that perceived levels of competency among secondary school vocational agriculture teachers of various demographic backgrounds were lower on adult education. However, perceived competencies in programme planning increased with years of high school agriculture teaching experience. This observation poses a major challenge to the implementation of SBESS, with respect to the categories of the relevant participants to be included. A possible hint from the findings of Findlay & Drake (1989) may be to involve a greater number of more experienced agricultural science teachers in the SBESS.

2.5.5 Extension Worker Qualities as a Factor of the Change Process

Some of the lapses in extension delivery system have been blamed on low calibre and poor training of extension staff. Röling (1995) notes that the quality of innovativeness in a farming community is clearly related to the quality of the extension worker in the locality. Similarly, Bansal (1991) stated that the success of an organisation depends, to a large extent, on the capability, competency, efficiency and effectiveness of its human resource base. This means, therefore, that the human resource development system of an organisation is an essential facility of management for improving the organisation's performance through improvement of the performance of its employees. This agrees with an observation by Kulkani (1985) that human resource development is an aid to efficient running of an enterprise. It is now generally accepted that organisations can significantly improve their efficiency, effectiveness and productivity through the development of their employees.

As asserted by Venkatesan (1995), the proper functioning of the T&V system depends on the effective training of agricultural extension agents. Access to information and technology as well as the background of the extension worker influence his performance (Franzel & Van Houten, 1992). For example, extension agents from non-farming and urban backgrounds were found to lack empathy with the farmer. Poorly educated staff lack the ability to adapt information to the farmers' situation, and effective communication skills. This must be taken into account when recruiting any agent to work with the extension delivery system.

Extension worker qualities such as intelligence, motivation and academic preparation and farm experience are considered as paramount for effective

extension career in Kenya (Leonard, 1977). The danger in using academic achievement for judging the potential ability to carry out technology is that it is easy to measure and can therefore be over-used to disqualify candidates who would be outstanding by using other criteria. Benor, Harrison and Baxter (1984) have pointed out that there is no evidence to suggest that unusual abilities deriving from intellectual capacity are required for village level extension work. On the contrary, it would seem that the abilities required are possessed by many people, and are brought out by the greater motivation, which manifests itself in better work behaviour.

Age and work experience of extension agents have been found to be relevant factors related to their performance and perceptions. According to McEnrue (1988), a number of studies have identified the length of job experience to be related to performance and hence competence. This indicates that time spent on the job serves as a learning period, thus enabling the individual to attain greater competency with respect to the specific job schedule on which he/she has been. Thomas (1976) found in Trinidad that both age and years of work experience had strong correlation with the performance of staff. Schmidt *et .al.* (1988) reported that the length or absolute amount of job experience affects performance independently of ability. Thus, irrespective of their intellectual or physical abilities, extension workers are capable of gaining vast amounts of competencies as they go about their extension duties over the years. These observations emphasise observations by Kolb (1984), Knox (1977), and Miller (1964) that the adults gather substantial amounts of experience as they go through their daily duties, and these enhance their performance and understanding. However, Knox (1986)

points out that that the mix of learning abilities and interests evolves during adulthood, as some learning activities become more attractive and easier; while others decline. These experiential effects influence farmers, teachers and even students who regularly work on agricultural projects over some years. Students must therefore be exposed to experiential learning opportunities in agriculture to enable them form their concepts and opinions about farming early in life.

Lawler (1973) indicated that age and seniority are generally positively related to job satisfaction and training. Adults and seniors seem to have more realistic goals to attain, and are, therefore, not unduly frustrated by some apparent failures that arise out of setting unrealistic goals for themselves.

Perceived training needs of extension workers are also related to their level of education, age and work experience. Sabihi (1978) reports that, young agents and specialists, as well as agents with lower educational levels, perceive a greater need for training in extension philosophy and administration than older agents and specialists. Similarly, Celis (1971) notes that Mexican extension agents with less than three years of work experience expressed a greater need for technical information, while those with more than three years wanted more of social sciences and extension methods. Adewumi (1976) observes that agents with Bachelors degree rate themselves as less competent than those with Masters degree. However, differences in the self-competence ratings were significant only in five out of the ninety-eight competencies. The most important deficiency noted by B.Sc. holders was the deficiency in objectives development. Gonzalez (1982) also found that there were differences among younger and old agents in their ratings of various competencies. Younger agents rated certain competencies lower than

older agents indicating that older agents felt they were more competent in their work. However, Randavay & Vaughn (1991) found no differences among different age groups in their ratings of the importance of professional competencies.

In a study in Uganda, Budke and Paddie (1994) found that older extension agents exert less effort in their work and were less satisfied with their supervisors. Thus, in planning any extension support programme, factors related to extension staff that need to be taken into consideration include age, work experience, level of education, motivation and intelligence, and background.

2.5.6 Motivation of Participants as a Factor of the Change Process

Motivation of extension staff to perform well and of other contact persons to diffuse information and technology is a factor of a complex mix of variables. Many contemporary authors have tried to define the concept of motivation. Motivation has been defined by Kreitner (1995) as "the psychological process that gives behavior purpose and direction." Buford, Bedeian, & Lindner (1995) defined it as "a predisposition to behave in a purposive manner to achieve specific, unmet needs." It has also been defined as "an internal drive to satisfy an unsatisfied need by Higgins (1994); and "the will to achieve" by Bedeian, (1993). For this paper, motivation is operationally defined as the inner force that drives individuals to accomplish personal and organizational goals.

Why do we need motivated employees for a change system? The answer, according to Smith (1994), is survival of the system. Motivated employees are needed in our rapidly changing workplaces. Motivated employees help organizations survive. Motivated employees are more productive. To be

effective, managers need to understand what motivates employees within the context of the roles they perform. Of all the functions a manager performs, motivating employees is arguably the most complex. This is due, in part, to the fact that what motivates employees changes constantly (Bowen & Radhakrishna, 1991). For example, research suggests that as employees' income increases, money becomes less of a motivator (Kovach, 1987). Also, as employees get older, interest one has in the work becomes more of a motivator. Interest in a particular work will arise as a result of curiosity, expected benefits from doing the work, or through some form of extrinsic motivation.

For an innovative system such as SBESS, it is important to recognize the factors that influence the motivation of key participants to participate in its activities in order to provide a sound basis for selection of sites, personnel, activities, time and materials. Motivation, according to Leonard (1977) is influenced by factors such as desirability of leaving a job, the ease of leaving, job satisfaction, role compatibility, personal characteristics, social status, and habituation to particular job or organisations. Costley and Todd (1987) view motivation as an important factor in determining what a worker can do to improve his or her social status. They note that status motivated behaviour must be clearly distinguished from other forms of motivation. Workers with high social status feel secure, confident and more committed to their jobs (Houston, Hammen, Padilla, and Bee, 1989). They indicate that such category of workers develop a strong bond between them and their jobs. Bucher (1985) observes that status deprivation reduces job motivation. People hate to be deprived of their social status. When that happens, negative behavioural patterns, such as a feeling of inferiority, anxiety,

lack of confidence and loss of interest in their jobs, begin to develop. The implication is that any programme that is perceived by an individual, as a threat to his/her social status is likely to be rejected by that individual. To be acceptable, a programme must be seen by all participants as worthwhile and gratifying. The determinant factors of the prospect for SBESS must therefore reflect participants' perception of the system as worthwhile and rewarding.

Five major approaches that have led to our understanding of motivation are Maslow's need-hierarchy theory, Herzberg's Two- factor Theory, Vroom's Expectancy Theory, Adams' Equity Theory, and Skinner's Reinforcement Theory. According to Maslow (1943), employees have five levels of needs: physiological, safety, social, ego, and self- actualizing. Maslow argued that lower level needs had to be satisfied before the next higher level need would motivate employees. Herzberg's work categorized motivation into two factors: motivators and hygienes (Herzberg, Mausner, & Snyderman, 1959). Motivator or intrinsic factors, such as achievement and recognition, produce job satisfaction. Hygiene or extrinsic factors, such as pay and job security, produce job dissatisfaction.

Vroom's theory is based on the belief that employee effort will lead to performance and performance will lead to rewards (Vroom, 1964). Rewards may be either positive or negative. The more positive the reward the more likely the employee will be highly motivated. Conversely, the more negative the reward the less likely the employee will be motivated. Adams' theory states that employees strive for equity between themselves and other workers. Equity is achieved when the ratio of employee outcomes over inputs is equal to other employee outcomes over inputs (Adams, 1965). Skinner's theory simply states those employees' behaviors that

lead to positive outcomes will be repeated and behaviours that lead to negative outcomes will not be repeated (Skinner, 1953). It suggests that managers should positively reinforce employee or participant behaviours that lead to positive outcomes. Managers should negatively reinforce employee behaviours that lead to negative outcomes.

Workers the world over have been motivated by several techniques, the commonest being the provision of incentives. The use of incentives is based on the belief that the motivated worker could be a productive and happy worker. However, the findings of Brayfield and Crockette (1985) show that incentives have little influence on job motivation. In fact, it is argued by Porter and Lawler (1988) that it is the performance of a job itself, rather than incentive, that could be a motivator. This job motivation and group cohesiveness at the workplace combine to determine high morale and good work output (Herzberg and Synderman, 1978).

These do not, however, rule out the usefulness of incentives in generating higher work output. Cascio (1989) revealed that when incentives intended to reward people fit the situation, performance increases by about 30% because of motivated behaviour. Again, Chellandurai (1985) contends that in an organisational context, an employee who is provided with sufficient reward in the form of salary and bonus ensures that his or her physiological needs are satisfied, and this largely motivates him or her. The amount of money received as rewards is usually not the most important issue, but it is the value of the money. What the salary or wage can buy is of relevance to the employee because that determines the ability to meet his or her needs. Costley and Todd (1987) indicate that the satisfaction of physiological needs is facilitated by the availability of money.

This means that providing cash payment for jobs and assignments is essential for achieving adequate work motivation and performance, because it is a paramount expectation of most workers. This may be an explanation to why people get attracted to better paid jobs whenever they qualify for those jobs.

2.6 Environment Required for the Change Process

2.6.1 Participation

Participation, according to Amstein (1971), is the re-distribution of power that enables individuals who were excluded from political and economic processes of social programming to be deliberately included in the future. This implies that people who hold power, in order to attract those who were not initially included in a programme, should actively pursue participation. Amon (1989) also regards participation as sensitizing people and thus increasing their receptivity and ability to respond to development programmes as well as encouraging their local initiatives.

The link between participation and the effectiveness of learning programmes continues to be emphasized (Pretty, Guijt, Thompson, & Scoones, 1995), Participatory learning can help rural people to analyse, plan, take actions, monitor and evaluate a range of issues and activities (Chambers, 1997). Thus, today, farmers are encouraged to take responsibility of their own learning. This they can do by voluntarily and actively participating in all activities of SBESS. Teachers and trainers (AEAs), according to Taylor (1998), are also recognised to have an input into what they teach farmers, as in the case of SBESS.

SBESS therefore seeks to identify all of the stakeholders who may contribute to the kind of learning that will be of benefit to both practicing and young prospective farmers. Dialogue and interaction are needed to reach an understanding of stakeholders' various interests in the curriculum development process of the schools in which SBESS would be based. In addition, there should be a mechanism that defines the roles of stakeholders within the curriculum development process and allows them to fulfill this role. In SBESS, some stakeholders will be insiders who have an ultimate knowledge of the educational system, such as teachers, headmasters and students. Others may be "outsiders" , for example farmers, AEAs and DDOs, policy makers, and funding individuals and organisations.

Ahmed (1978) notes that usually, there is lack of political commitment to change and disturbance in the status quo among the various actors in a system. But change ultimately leads to development, and is a necessity. Deshler and Sock (1985) have identified the concepts of participation, cooperation, and empowerment as very important in development. Also, Lee (1972) found people's participation to be very important for the success of any programme. She noted that local participation might mean involvement in planning, including assessment of needs. In her opinion, even if local people do not take part in the planning, they should be, at least, informed of the plans designed for their area if they are expected to consent and cooperate in the programme implementation. According to Deshler and Sock (1985), the underlying assumption of participation in the context of cooperation is that, beneficiaries of any development programme are required to cooperate with planners, administrators and the power elite. This will enable a

satisfactory response to the needs and priorities of the beneficiaries, provide access to decision-making, and share the costs and benefits of development equitably.

Studies conducted by Merriam (1983, 1984); Schaie & Geiwitz (1982); Troll (1982); Hultsch & Deutsch (1981); Krupp (1981) and Knox (1977) indicate that the learning styles of adults are influenced by such personal characteristics as age, formal education, previous specialized experiences, intelligence and personality. The learning style of an individual is the characteristic and preferred way in which the individual engages in learning activities. Thus, in introducing an innovation such as SBESS, the rate and modes of participation and adoption in the programme activities will emanate from the individual learning styles of the key participants, which is also influenced by their age.

Rural farmers are usually targeted as the immediate beneficiaries of any agricultural development programme. Unfortunately, however, the input of the rural farmer in planning such programmes is almost non-existent. This situation may be accountable for most of the failures of agricultural programmes in the rural communities (Deshler and Sock, 1985). The reason is that farmers usually feel less obliged to implement decisions, which have been made on their behalf by external change agents. Thus, farmers need to be empowered in order to be in control of policy and managerial aspects of programmes intended for their development. Kindervatter (1979) describes empowerment in terms of people gaining an understanding of, and control over social, economic, and/or political forces in order to improve their standing in society. Small, low-resource farmers present a vast segment of developing country populations; higher incomes, education, and greater involvement in development can encourage them to make them more

efficient in the use of land, labour, and capital resources in rural areas ((Swanson, 1997). There is a growing consensus that to create a demand-driven technology system, there must be direct involvement by farmers in identifying problems, establishing priorities, and carrying out on-farm research and extension activities. (Rivera, Zijp & Alex, 2000). Demand driven-extension is desirable in several instances, although it is essential to strike a balance between the demands of government and those of farmers in different economic categories (e.g. Estate, emerging, low-income, and marginal). Thus, the beneficiaries of a programme must be seen as demanding a degree of power or control that guarantees that they can be in charge of the programme.

2.6.2 Partnership.

The task of technology transfer is not a prerogative of extension staff of the Ministry of Agriculture only. New paradigms of extension, therefore, consider partnership between government, farmers and the private sector development agencies as an essential development. In a partnership, equal authority is vested in the parties to it. In some countries (e.g. South Korea, Taiwan), farmers' associations are equal partners with decentralised government agencies. According to Duvel (2000), if organisational linkage structures are to facilitate maximum participation and ownership, then they should be as close to the grassroots community as possible. In the case of this study, unless the community members regard such organizational structure as their own, they will have difficulties in relating to it and effectively participating in it. This also implies that it primarily serves the interest and purpose of the community and not those

of the devcloping organizations. The community in this case comprises the school and the farming communities.

Rivera (2001) stresses that in a true partnership, the partners must be in a voluntary association and function on the basis of equal rights and responsibilities, with a financial budgetary partnership between government, farmers and other partners. Financial partnership must not be based on financial resources alone, but could also be based on payment by kind, such as offering some services to the extension service, or giving out part of crop produce as payment. Usually, the ability of some categories of people and organisations to disseminate information and technology is under-estimated. Biggs & Farrington (1991) provide evidence to show that farmers had greater mutual confidence in some voluntary organisations that had better qualified personnel for disseminating agricultural technology. In Ecuador, for instance, greater and more sensitive mutual confidence was established between farmers and private organisations, than government services (Bebbington, 1989).

The importance of private organisations in extension has also been noted by Venkatesan (1995). Engel (1995) observed that private agencies compete increasingly with government services and, often very successfully. According to Bebbington (1989), the most important source of information about any programme is the participants of the programme themselves and the beneficiaries. They note, however, that a range of other potential sources exist including non-participants, proponents and critics; key informants (school participants, parents of participants, volunteer leaders, etc.- individuals who are likely to know something about the programme and its effects. Rivera (2001) states that the new

paradigm of extension requires a considerable partnership with educational institutions in preparing an educational workforce.

This calls for greater investment by governments in education, in-service job training and the knowledge exchange component of the technology system. New strategies are taking on primary importance for policy makers concerned with meeting global market place demands while at the same time catering for the needs of their rural populations.

2.6.3 Funding

Funding of agricultural education and extension programmes in Ghana is largely done by the central government. However, the private sector, in recent times, has increasingly been contributing funds and other resources toward the development of agriculture and agricultural education (FAO, 1991). Notably, various non-government organisations (NGOs) and some religious groups are providing privately funded extension to several farmers in various parts of the country. The problem with the proliferation of private funding for agriculture is that there is lack of coordination and each funding agency seems to go its own way.

Experience from Benin as reported by Cassaday, Monnet & Dowswell (1995) has shown that funding for agricultural extension programmes is more effective if all sources are channelled through one agency. For example, extension services in Benin were financed through a variety of integrated rural development projects and each financing agency acted independently. This was accompanied by differences in approaches and methodologies to extension delivery.

The main cause was lack of adequate and efficient structure to guide extension at higher levels. This led to several deficiencies including:

1. Failure to take farmers' concerns into consideration when developing technological packages;
2. Lack of coordination between farmers' needs, extension services and research activities;
3. Inadequate training for extension staff. (Training was held only briefly each year.);
4. Inactive and inefficient performance by the supervising agency (Ministry of Rural Development); and
5. Absence of careful evaluation of extension services.

The development of SBESS activities needs to take all such deficiencies into consideration at all its developmental stages in order to satisfy both farmers and students.

2.7 Competencies Needed for Agricultural Extension Systems

The actor in every occupational or professional venture needs to be competent with respect to the tasks involved. Pottinger (1979) notes that every professional's practice domain is complex and multi-dimensional. He adds that one will choose a particular procedure for assessing competence based on his or her definition of competence. Thus, if competence is considered only as exclusively comprising knowledge, then knowledge tests may be an appropriate

measurement devise. On the other hand, if behaviour is considered as part of competence, then tests must invoke behaviours, which reflect those aspects of competence simulation techniques. Also, those who consider personal attributes such as empathy, well developed cognitive processes, moral reasoning abilities, interpersonal effectiveness, or motivation as a part of competence, must also use measurement tools in which these are reflected. Professional competence used to be commonly judged by the outcome of one's work. According to Pottinger (1979), as long as consumers could freely choose their service providers based on their judgment of the quality of outcomes, however subjective this may be, this determination of competence is viable and socially acceptable. He describes new criteria that attempt to distinguish between tests of academic knowledge and competency-based tests as trivial, because the quality of job performance, which is the only real evidence of competence is not required in either type of test.

Ayewoh (1983) and Ongondo (1984) have identified professional competencies needed by extension agents in various developing countries. They include professional competencies in the areas of administration programme planning, and execution, evaluation, communications, teaching and extension methods, and understanding human behaviour. Thus, apart from the extension agents themselves, any partner in the implementation of extension programmes must possess a desirable measure of the required competencies.

The proficiency and competence of a person are not static; they entail an active attention to problems and opportunities and continue to change throughout life. Deci (1980) and Loevinger (1980) observed that human beings develop throughout their lives by actively seeking information and meaning, and as

a result, they improve their capabilities and enhance their proficiencies. The individual's characteristics and relationships at each stage of his/her development reflect reciprocal interactions with the existing environment, relationship with his/her own past, and his/her outlook of the future (Knox, 1977). It is recognized that a person's sense of perceived proficiency (competency, efficiency) is a crucial mediator between interest and performance (Bandura, 1982; Mckeachie, 1980. Biddle & Thomas (1966) noted that performance is focused of action tasks, most of which are aspects of major life activities. The ability to understand the discrepancy between current and desired proficiencies can energise the individual to change and thereby develop his/her human resource. This implies that every participant in a programme should clearly identify what exactly has to be accomplished (the objective) in the course of the programme. In the real life situation, people compare their current abilities against a desired standard of proficiency, which they strive to attain.

Several different types of competencies are needed for efficient extension delivery, and extension workers at different places and at different times have expressed different levels of needed competencies. Chizari (1991) found that Iranian extension workers in the Fars Province considered ability to plan extension programmes, select appropriate methods for teaching and communication, develop an integrated programme, analyse evaluation data and develop a management plan, as the main competencies in which they were deficient. Findlay (1992) identified such competencies as programme planning skills, leadership skills, guidance and counselling abilities, teaching techniques, occupational experience, adult education skills and school and community relations, as very important for effective

programme implementation in a community. These competencies will be very necessary for a successful programme take-off, especially in rural communities.

Ntifo-Siaw (1993) identified twenty competencies needed by agricultural extension agents in Ghana to enhance their performance. These are mostly competencies that can be acquired either through in-service training programmes or through formal education in the polytechnic or university. Gonzalez (1982) identified as many as 144 competencies needed by extension agents in Pennsylvania, 26 of which were recognised as appropriate for preparing the agent to enter the job. Six of the competencies were considered as appropriate for training the agent in a graduate programme, while 116 could be taught to them during in-service training programmes.

These findings point out that competencies in extension delivery cannot be attained in a single-phase educational system. Competencies are acquired through a variety of educational experiences. Findings similar to those of Gonzalez (1982) had been reported by Ayewoh (1983) on extension agents in Nigeria. In Kenya, Ongondo (1984) found that most of the extension agents there required training competencies that prepared them before they entered the job. This is a pointer to the weaknesses in development of communication skills in the lower levels of that country's educational structure. A good foundation in communication skills facilitates and reduces the weight on pre-service training in extension, and also people in other professional institutions (e.g. teachers) who have gone through the same type of basic education will find in easier to assist in extension delivery activities. In SBESS, Agricultural Science Teachers who do not have any pre-service training in extension are supposed to join hands in

communicating agricultural innovations and technologies to farmers and students, using the school farm as a training facility.

Benor & Baxter (1984) reported that in several developing countries, pre-service training is generally designed to cover a broad range of subject matter, and is often more of academic than practical training for field action. This explains why practical orientation courses are often needed for newly recruited agents before they are posted to their stations to begin their extension career. Also, there is usually the need for regular in-service training courses to build new competencies and update the existing ones in extension agents already in the job. Ntifo-Siaw and Agunga (1994) however discovered that in-service courses for agricultural extension agents in Ghana were rather irregular, ad-hoc, and not necessarily tied to any specific priorities for agricultural development. This adversely affects the development of extension agents' competencies and staff who are required to discharge educational responsibilities are likely to feel they are inadequately trained to perform satisfactorily.

2.8 Supervision of Programmes

Factors that have been found to be related with competency and performance of extension personnel include supervision and some personal characteristics such as age, work experience, and educational qualification. No organisation functions effectively without a strong leadership and therefore effective supervision. Improved quality of extension supervision is therefore a major target for effecting improvements in agricultural production. Buford,

Bedeian, & Lindner (1995) noted that supervision is vital for the success and impact of any agricultural extension system. Also, they disclosed that supervision is one of the major determinants of motivation to work. It is therefore essential to factor into SBESS an efficient supervisory system that will ensure its sustainability and performance. Supervision in any endeavour requires that supervisors are in adequate numbers and of high quality in competence. This is not likely to pose problems in SBESS, since there exist efficient supervisory manpower in Ministries of Education, and Food and Agriculture.

It was observed by Röling (1990) that many extension agents preferred to learn by active experimentation, which involves practical application of information, small group discussions, projects and opportunities to practise and receive feedback. All these activities require supervision and correction where one is in doubt as to the approved procedure. In this regard, extension supervision must take place primarily in the field where farmers work, as opposed to village meetings. This enables agents to assess their effectiveness in providing good leadership. (Benor, Harrison and Baxter, 1984). Although supervision in itself cannot produce good agricultural extension per se, good extension is rarely possible without good supervision. The purpose of agricultural extension supervision is not just to check whether farmers and extension agents do their work in a correct, timely manner, and more importantly to assist and guide the staff to do their work effectively.

Supervision requires good leadership, and no organisation can perform creditably without good leadership. Agricultural extension is a challenging enterprise that entails a complex of organizational and operational

difficulties, and therefore needs a special strong leadership of professional extension services (Benor, Harrison and Baxter, 1984)

2.9 Farmers' Role in Extension

Chambers (1983) noted that many of the farming practices that were once considered as backward are now seen as appropriate. Examples of these are the zero-tillage or minimum tillage systems and mixed farming which have been used by farmers in the forest regions of Ghana for ages. Now, most of the traditional practices of the African farmer once regarded as wasteful and irrational are found to be prudent, sound and very beneficial (Belshaw & Hall, 1972; Norman, 1974; Belshaw, 1979). The farmer is now considered as a source of indigenous knowledge and skills that now need to be assembled and modified to face the challenges of the changing environments. It means therefore that the farmer is now the source of research data in the search for sustainable agricultural extension practices. In spite of these developments, the indigenous knowledge of the rural people in most developing countries is enormously underutilised for agriculture and rural development. Farrington and Martin (1993) have noted that, small farmers' expertise represents the single largest knowledge resource not yet mobilised in the development enterprise, which cannot be simply ignored. These findings suggest that indigenous knowledge systems of farmers should be regarded as a part of national resources. These observations are applicable not only to agriculture, but also to all other sectors of rural development.

Röling (1994) asserts that the African farmer is perfectly capable of adopting complex farming systems to changing situations through experimentation, without any government support. He cites the success story of the Adja plateau of Benin (Brouwers,1993) as an example. Spencer and Badiane (1995) have also reported the innovativeness of traditional small-scale farmers in Africa. When farmers resist a new technology, it is probably because it is not compatible with their objectives, resources or environment, and not because of their backwardness or irrationality (Franzel & VanHouten, 1992). Stroud (1989) discovered that the reluctance of small-holder farmers in Ethiopia to adopt soil and water conservation methods, or to control *striga* weeds attacking their sorghum, was because they lacked secure land tenure. There is ample evidence to show that the so-called innovators have more land and other physical resources at their disposal than the other farmers in their group. They also have more contact with a range of information sources. Farmers at the extremely deprived end are regarded as the laggards (Rogers, 1983). These farmers tend to lack confidence and enough security to take the risks associated with adopting a new technology.

Thus, it is rational that sustainability of agriculture must be defined in terms of human reasons, activities and agreements. The issue of whether farmers are affected by the outcome of any innovative process needs to be considered here in the roles they have to play in the process. Leeuwis (2004) asserts that farmers may regard a problem as serious and important but may not experience the consequences personally. When the people are personally involved in a situation, in the sense that their immediate aspirations are threatened, they may be more inclined to learn and adopt as referred to as high "personal relevance" by

Verplanken (1989), or "outcome-relevant involvement" by Johnson & Eagly (1989). However, people's willingness and enthusiasm to be involved in a programme may be restricted to certain topics and goals. According to Leeuwis (2004), these restrictions may actively exclude other topics, goals and activities. Hence people's involvement in programmes may simultaneously enhance and obstruct participation and adoption. This is an important factor to consider especially when fashioning out the roles of individuals and groups in specific agricultural programmes.

2.10 Attracting the Youth and Educated into Agriculture

2.10.1 The Need to Attract the Youth and Educated into Agriculture

Agriculture must not continue to be for only illiterate rural people who may not have other options to livelihood. It should be able to attract educated people as well as those who have adequate capital and management skills to attract technology and bring about high efficiency in the sector (Obeng,1995). The rising average age of farmers with a corresponding decline in farming population has been reported by Ocloo (1991) in Ghana. This means that as the existing farmers grow old the youth do not replace them by taking up farming as a career. In fact, Twum Barimah (1977), Blege (1986) have noted that when young people in Ghana complete school, they are not willing to take up farming. Even young people who have been specifically trained to take up farming as a self-employed career tend to seek public employment. This has led to a continuous decline in the contribution of agriculture to the national economy. There is always some perceived social

consequences and risk associated with accepting a new concept or system, as well as alternative cognitions. Leeuwis (2004) argues that novel situations and cognitions that people encounter may be experienced as either threatening or rewarding. They are threatening when people feel that accepting the alternative system may jeopardize their interests in a specific context. Social psychological research indicates that people are less inclined to accept radically different ideas and find it easier to incorporate those that are less conflictive with existing perspectives. (Sherif, Sherif & Nebergall, 1965). This emphasises the need to teach agriculture in a more practical and less cognitive manner in our schools. Using supervised field enterprises as a teaching methodology for agriculture, as prescribed by Phipps (1977), is a proven way for getting the youth interested in agriculture, through formal education.

Chung (1991) notes that the literacy level among farmers is highly correlated with the utilization of modern agricultural technology. Therefore, in Zimbabwe, efforts to raise agricultural production have been partly geared towards providing the youth in school with knowledge and skills that are closely linked with existing realities. Literate farmers are more receptive to advice from agricultural extension agents, and are more able to deal with technical recommendations that require a certain level of literacy or numeracy (CIMMYT, 1993). Farmers with little or no education require more simple information that is easily understood, and must be assisted with audio-visuals, and more personal contacts to enable them understand and learn new technologies (Watts, 1989).

2.10.2 How to Get the Youth and Educated Interested

One major means by which the youth have been attracted into farming is by making the agricultural curriculum in schools real, practical, interesting and relevant to the purpose of creating future farmers from the school-going youth (MOFA , 1995). This can be achieved through an effective linkage between the school and the extension system, at the community level. It is, therefore, necessary to examine school–extension linkage systems that can provide guidance for developing community-specific linkage systems. The development of a school-based extension support system must draw guidance and inspiration from structure and functions of various school and extension collaborations in the past and elsewhere. According to Knox (1986), an individual's desire to participate in an activity is motivated by a combination of personal and situational facilitators and barriers. Most of these influences are filtered through the individual's subjective perceptions. What is important, therefore, is to devise agricultural education programmes that will influence individuals to develop positive perceptions about agriculture.

2.11 Extension and School Linkage

There is a strong feeling among analysts such as Carter (1991), Obasanjo (1991) and Berg (1991) that extension activities should be broadened and decentralised in order to achieve better results. From the other angle, Bawden, Macadam, Packham, and Valentine (1984) noted that the organizational structure of educational institutions needs to be open and flexible to accommodate rapid

and unpredicted changes in the needs of learners as well as the supra system of government funding policies. These two assertions are very relevant to the Ghanaian formal education and extension systems. They made reference to the special importance of the involvement of the school in community agricultural programmes at the active experimentation stage of Kolb's (1984) Experiential Learning Cycle, and suggested possible ways of linking the school with agricultural extension programmes. They include:

1. Outreaching into the farming community through external offering of credit and non-credit courses, (e.g. vacation training courses in some agricultural technologies, using school agricultural science teachers and extension agents as resource persons);
2. Increasing the emphasis on real-world problem situation improvement as the focus for learning projects (as exemplified by the Supervised Enterprise Projects concept practised by the School of Agriculture of the University of Cape Coast);
3. Developing the school/college farms into purposeful farming systems that are integrated and thus better able to respond to social and ecological forces. (These can then qualify to serve as models to imitate by farmers in the local community);
4. Continuing to adjust and adapt the way current programmes are organised and managed. (This requires close collaborations between the school and its external environments for exchange of ideas and information);

5. Adapting the organizational structure and processes of the school to the requirements of new programmes. (This is very relevant for providing opportunities for change systems such as SBESS. The school curriculum needs to be sensitive and responsive to new programmes);
6. Participating in the development of educational programmes with a similar orientation in other countries. (This will enhance the broadening of ideas and creation of more alternatives based on new experiences); and
7. Broadening the educational environments beyond agricultural systems to incorporate issues of rural development, thus making the school system sensitive to rural development issues.

It is important to envision how the above suggestions can be achieved in the basic and secondary schools. Obviously, some of them are better attainable at the higher levels of education as in the example of the Sasakawa African Fund for Extension Education (SAFE) model of mid-career extension education programme in Ghana and some West and Eastern African countries. (Zinnah et. al., 2000)

FAO/World Bank (2000) proposed a system by which agricultural extension could be broadened and liked with formal education and research to achieve better and more sustainable results. This proposal sought to promote linkages through funding grants requiring cross-institutional activity between agricultural knowledge and information systems and their clientele as illustrated in Figure 2 below.

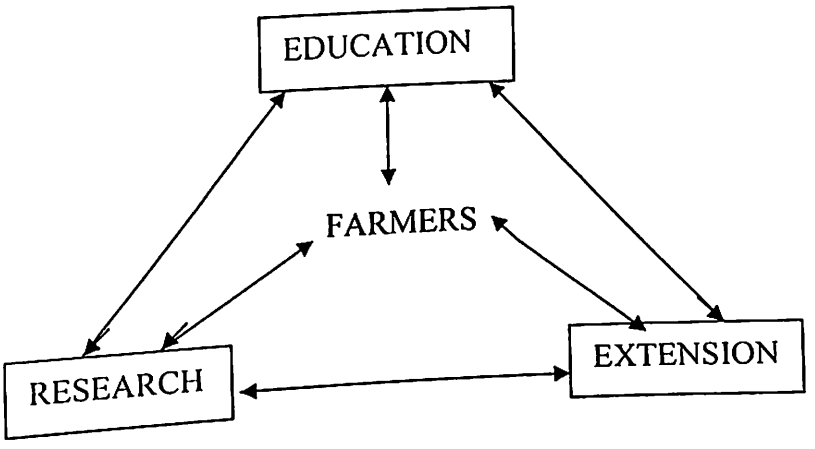


Figure 2. An Education-Extension-Research-Farmer Linkage Model

Source: FAO/World Bank (2000)

The system integrates farmers, agricultural educators, researchers and extension personnel. Similarly, Rivera, Qamar and Cowder (2001) noted that agricultural extension is closely linked with formal education. They maintain that agricultural extension receives relevant information from the agricultural education system and feeds back field observation into education. Extension, according to them, is also professionally associated with agricultural vocational and higher education.

The school can be linked to extension in several ways. Lane (2000) outlined a number of ways in which educational institutions (including universities) are linked to agricultural extension in Cuba. One of the methods is the "school-farmer linkages" in which a three-component approach is used to educate farmers. These are (a) the educational institutions (schools), (b) research stations and (c) extension and outreach services. Another linkage system is the "School-agricultural organization-farmer linkages", in which some NGOs work

closely with the educational institutions, to educate upcoming and practicing farmers. Some organizations own their own schools for cooperative and individual farmers. The purpose of this type of linkage is to qualify professionals linked with research, provide training in the design, management and evaluation of sustainable agro ecosystems, and to facilitate the implementation of sustainable methods of food production. Beneficiaries only pay the cost of books, while the NGO bears all other costs. A third linkage system is the "school-community linkages". In this system, the educational institutions, notably the agricultural universities work in collaboration with the administrators of agricultural extension agencies in conducting research, analyzing data, and determining which information should be diffused and what methods to use (Adhikarya, 1994).

Another linkage known as the "university-government-professional organization-community linkages" is connected with mostly urban agriculture in which the universities play the role of offering technical assistance to urban agricultural organizations and clubs in gardening and livestock management. According to Adhikarya (1994), assistance in this case is not limited to simply laymen's advice, but is direct application of scientific knowledge. Others are the "Civic organizations-community linkages" and the "National and International agriculture linkages".

In 1991, Ohio State University (OSU) Extension created the concept of agent support teams to assist county agents in planning and developing programs, appraise agent performance, and encourage agent professional growth and development. A support team is comprised of the agent's county chair, appropriate district subject matter specialist(s), and district director (who serves as an ex-

officio member). The support team is responsible for providing direction and guidance to an agent by helping plan and evaluate educational programs, assisting with the development of the yearly plan of work, observing agent teaching sessions, serving as professional role models for the agent, and providing feedback to the district director for performance appraisal purposes (Zoller & Safrit, 1999).

The America Farm School of Thessalonica is a system used in Greece to enable school-going youth and farmers benefit from the expertise of established agricultural business men. It is a long-term partnership between schools and companies in agriculture and food industry. The companies are given the opportunity to operate within the school. Demonstration farms used by the companies for organized presentations of agricultural inputs and equipment to adult farmers, and the benefits of the on-campus operation of two private businesses, and of an independent state funded laboratory to the curriculum serve as important educational facilities to the students. One method by which extension services can be extended to the schools is by using the school itself as a contact agent in the T&V system, in a situation analogous to the school-based curriculum development proposed by Skilbeck (1975). Skilbeck's model offers value to the school-based extension support system (SBESS) as envisaged in this study. In Skilbeck's (1975) system, the school played the central and coordinating role between government policies and local educational needs.

Omoregbee(1995) asserts that developed nations had an early awareness of the need to relate education to the needs of the population, including farmers. This led to the development of agricultural societies, changes in the school curricula, and the establishment of skill-training schools, Phipps & Osborne (1988) note

that the youth involvement in agricultural development is much minimal. This is desirable considering the fact that the future belongs to the youth. Agricultural development means occupation for the youth development, especially in the developing countries where the major occupation is farming.

Although the potential value and the need for new types of agricultural education are evident, the kinds of agricultural education, which will prepare and motivate the youth to become farmers have been slow to develop. Okigbo, Sabuti and Baker (1993) point out that for a sustainable development of agriculture, a high priority should be given to education and research development. An investigation into new forms of agricultural education and agricultural extension method that will create efficient present and future farmers is the task ahead in this study. They argue that further education is not irrelevant to extension work. Those who are best at the most intellectually demanding skills have the certificate of Primary Education. Yet, the attainment of secondary education leads to a clear drop in performance in such areas of extension as: explanatory ability, visit effort, agricultural informedness, and innovativeness. Similarly, in Western Nigeria, Harrison (1969) notes that there is no evidence to suggest that unusual abilities deriving from intellectual capacity are required for village level extension work. On the contrary, it would seem that the abilities required are possessed by many people and are brought by the greater motivation, which manifests itself in better work behaviour.

The ability of school pupils and teachers to influence traditional agricultural practices must therefore not be under-estimated. Leonard (1977) found in Kenya that, agricultural extension agents who have only attained the upper

primary education have a clear tendency to know more and to explain better than those with either secondary education or only lower Primary schooling. He notes that this curvilinear tendency is evident in all technical areas of agricultural extension. However, the more complicated a skill is, the higher the educational level at which the best performance can be achieved. This implies that, it is possible for pupils in Junior Secondary Schools to adequately influence the dissemination of simple farming technologies in the farming communities. Gorton (1980), however, prompts that the acceptance and effectiveness of a proposed innovation in a school, apart from the important reference groups, may also be enhanced or impeded by the attitudes and actions of other individuals and groups associated with the school district. Thus, the external environments of the school must be clearly understood and considered in the formulation of approaches in school-based innovations such as SBESS. Because each of these individuals or groups is part of the informal communication network which exists in the community, it is essential that change agents identify their potential for support or resistance and take those factors into consideration when introducing the innovation.

A number of models for creating linkages between the formal educational institutions to agricultural extension have been developed and experimented in various institutions and countries over the years. These models vary mostly with respect to their motives and mode of operation.

2.12 Policies and Institutional Arrangements in Extension Support Programmes

The purpose of this thesis is to investigate a linkage system for facilitating a school-based agricultural extension support system that builds on partnerships between the various key players that would be identified in the study. The importance of the roles played by institutional policies and arrangements in the development of linkages in extension systems has been recognized by Düvel (2000). For example, the relevance for developing a school-based extension support system is derived from the policy guidelines for long term development plans in Ghana termed Vision 2020 (Government of Ghana, 1994). It is highlighted in the document that there appears to be no coordinated agricultural education policy in Ghana; and there is very low practical component of agriculture taught at all levels of education as a result of inadequate training given to teachers at the lower levels to teach agriculture practically. The proposed solution to the problem was to include a review of the state of agricultural education in the country in order to formulate an agricultural education policy that will guide and coordinate the operations of the MOES, MOFA., followed by a review of the curricula of both formal and non-formal agricultural education at all levels including agricultural extension. There is also expected to be an improvement of agricultural education at all levels to make it more practical through upgrading teaching staff, teaching facilities and demonstration farms. This is of particular importance to SBESS which is founded on upgraded agricultural curriculum, teaching staff and school farm for demonstration of innovations.

2.13 The Theoretical Foundations

2.13.1 Systems Imagining Alternatives

The theoretical foundations of this thesis was based on a systems technique for developing alternative ways of thinking and acting, known as "envisioning alternative futures". According to Ilsley (1984) fostering the capacity to speculate on the alternatives for solving a problem, or creating a change should be a common theme among all kinds of educators, trainers and adults. Boshier (1986), for instance, has provided imaginative scenarios of how lifelong learning society can be created. The process of imagining (Boulding, 1976) or envisioning has been defined (Srivastva, 1983) as creating in one's mind an image of the desired future organisational state that can serve as a guide to interim strategies, decisions and behaviour. Bennis (1983) defined "envisioning alternative futures" as the capacity to create and communicate a compelling vision of a desired state of affairs – to impart clarity to this vision.(or paradigm, of context, or frame) and induce commitment to it.

"Envisioning alternative futures" can be used to develop preferred scenarios in agricultural extension, by asking a series of questions such as the following:

i. What would this problem of extension be like if it were managed better?
ii. What changes would take place in the present state of affairs?
iii. What should be done differently with the people involved
iv. What patterns of behaviour would be in place that currently are not?
v. What patterns of current behaviour would be eliminated?
vi. What would exist that does not exist now?

vii. What shall we have that we do not have now?

viii. What would be happening that does not happen now?

ix. What decisions would be made and executed?

x. What accomplishments would be in place that are not now?

The success of techniques for imagining alternatives is assessed by the extent to which they help people to break away from the existing patterns of thought and action. Most of these techniques focus on placing people in unfamiliar, sometimes stressful situations and encouraging them to reflect on their reactions to this unfamiliarity. Adams (1988) describes the process of bypassing the familiar perpetual, cultural, intellectual and emotional blocks as "conceptual blockbusting." This pattern of problem solving is central to a number of mental processes and changes. It however takes considerable emotional strength and psychological courage to admit to ourselves that our familiar explanations and allegiances might need to be rethought and revised. People cannot be forced to imagine alternatives. While we might think it is in the best interest of people to change their lives, this change must come as a matter of desire by the persons concerned.

Every kind of innovation needs to be temporarily protected because effective alignment and the co-evolution of any coherent package of technical and social arrangements take time. It requires learning from mistakes, experimentation, careful adaptation, etc. For innovations to become mature, therefore, it is essential to create a safe space for experimentation and development to exist in the innovation process. (Kemp, Rip & Schot, 2001)

The systems approach is a way of tackling complexity and change – a way of improving problem situations. The problem of inadequate staff in extension

for practising farmers, coupled with inappropriate agricultural education in schools for future farmers can be solved through systems analysis.

2.13.1 Systems Analysis

A system is defined by O'Connor & McDermott (1997) as something that maintains its existence and functions as a whole through the interaction of its parts. We are taught to think and reason logically, to understand by analysing and synthesizing. But according to O'Connor & McDermott (1997), this approach does not work when dealing with living systems, because people and events are not governed by the rules of logic; they are not easily predictable and solvable as mathematical equations. This implies that issues concerned with educational systems where especially people are involved, should be investigated systemically. Agricultural extension systems deal with adult learning for practical application through real life experiences that are governed by complex systems, and their analyses elude straight line logical reasoning.

Systems analysis looks at the whole and the parts, and the connections between the parts (studying the whole in order to understand the parts and vice versa). Analysis of agricultural extension systems must take time into consideration, because systems have certain behaviour over time. Time delays and oscillations are typical features of systems which cannot be ascribed without the time dimension. Dynamic thinking means to foresee (possible) . future developments (O'Connor & McDermott, 1997). Strom & Bawden (1991) have provided a simplified drawing of the various processes forming a "soft

systems" analysis that looks at the task at stake holistically (in terms of the facts, the feelings, emotions, structures, the processes, the environment, politics, economics, etc.,etc.) as shown in Figure 3 below.

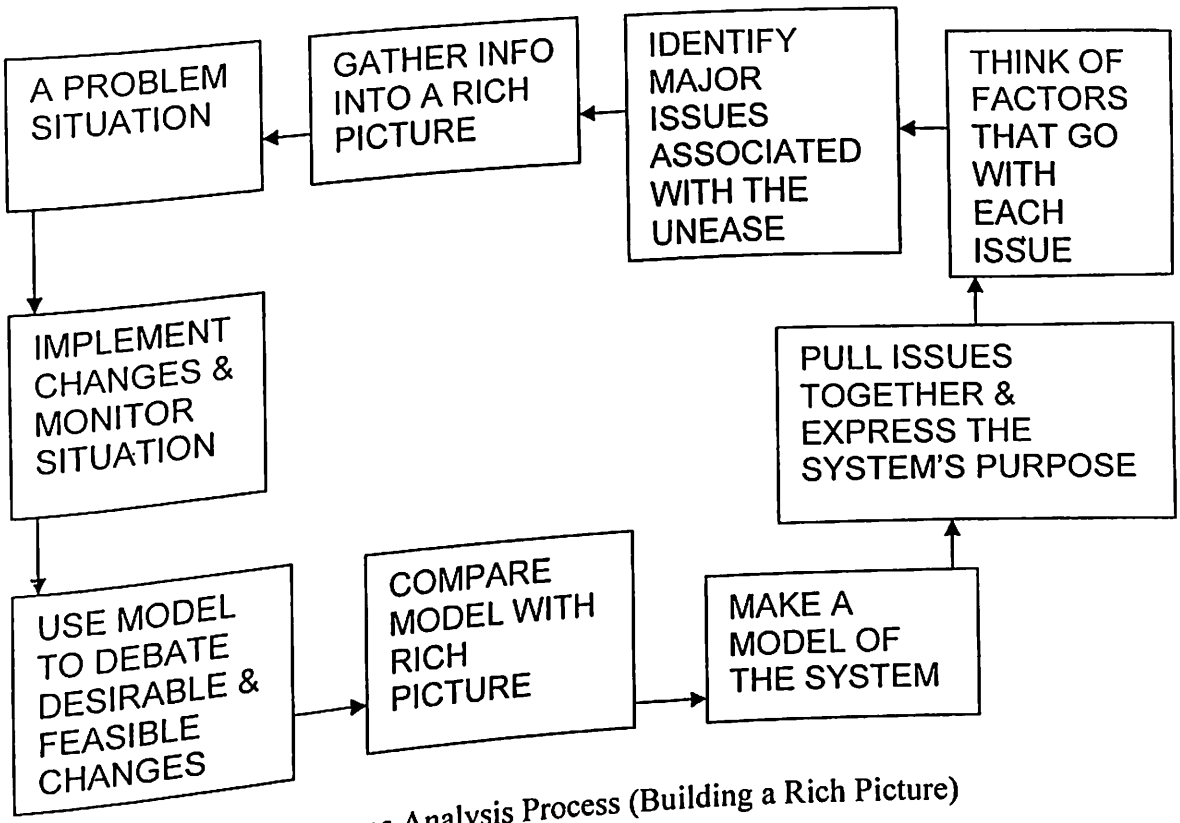
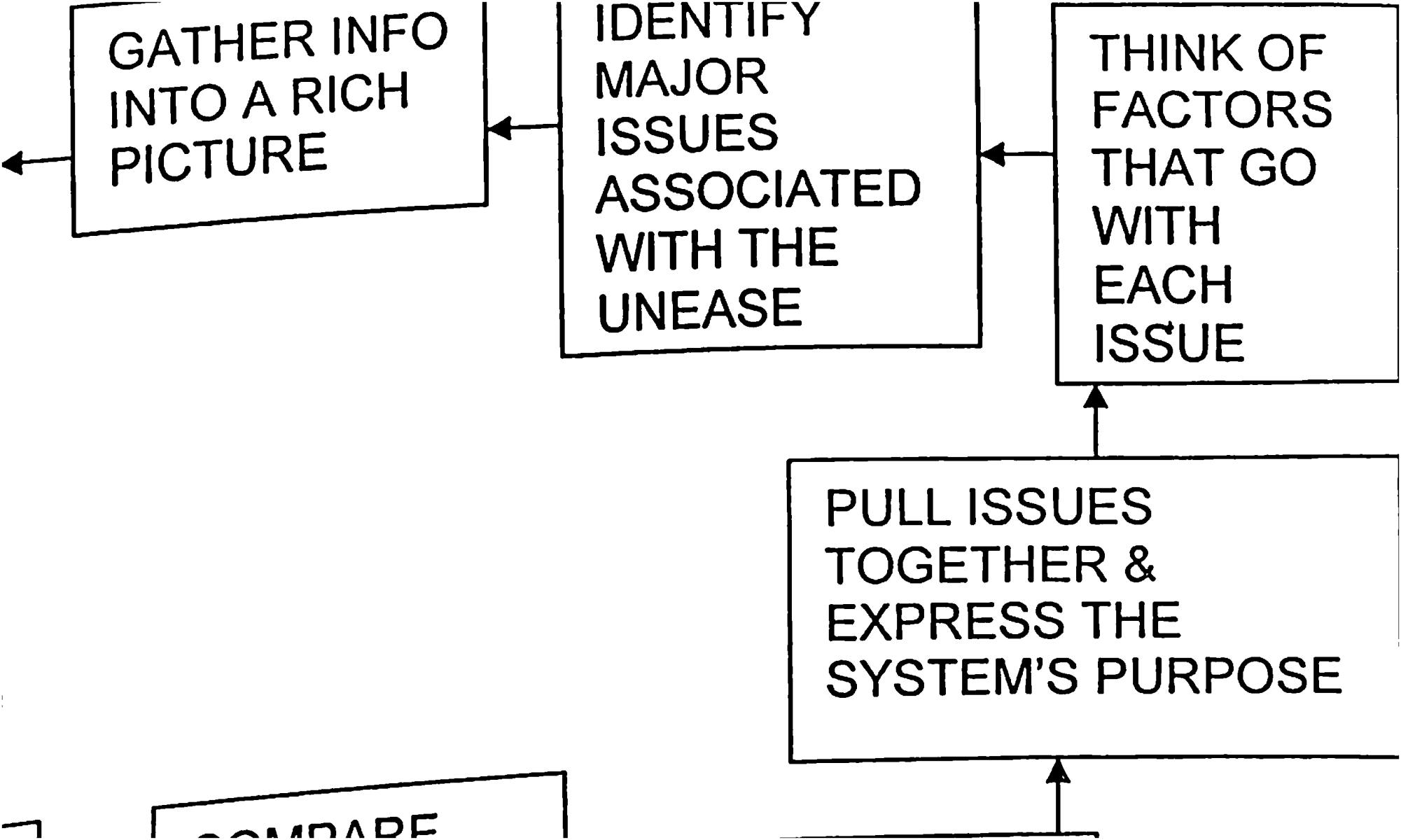


Figure 3. The Soft Systems Analysis Process (Building a Rich Picture)

Source: Strom & Bawden (1991)

What is termed a rich picture is in reality a big "messy" picture of the situation which can be modified and re-modified, as long as new ideas continue to emerge. Information for building a rich picture of the situation through a systems analysis can be obtained through brainstorming, questionnaires, interviews, walking through the location of the problem for personal observation and experience, reading, and other means of data collection. It is often very helpful to try looking at the same problem situation from different perspectives


GATHER INFO INTO A RICH PICTURE
IDENTIFY MAJOR ISSUES ASSOCIATED WITH THE UNEASE
THINK OF FACTORS THAT GO WITH EACH ISSUE
PULL ISSUES TOGETHER & EXPRESS THE SYSTEM'S PURPOSE

According to Bawden (1995) the integration of the learning process along a learning continuum stretching from holism to reductionism offers a hierarchy of interconnected methods of enquiry. The choice of the level of communication enquiry and appropriate methodology by the researcher – learner will be contingent upon the nature of the problem situation. Vietor & Moore (1992) note that agriculturists in particular, are more concerned with real-world application of systems ideas to solve problems in contexts ranging from farm to government policy levels. A study of the prospect for SBESS as an alternative agricultural extension system must therefore consider its applicability to real extension and farming problems.

2.14 Empirical Framework for Analysis (SWOC and Force Field Analyses)

The derivation processes used in this study for the concept, prospect analysis for a school-based extension support system were two systems approach models namely:

i. SWOC analysis
ii. Force Field Analysis

These were adapted at various stages of the study to arrive at the set objectives.

2.14.1 The SWOC/SWOT Analysis.

The factors that serve as driving or restraining forces for the prospect for a school-based extension support system were determined using the SWOC or SWOT analysis. The SWOC or SWOT analysis can be a useful process when

anticipating a change, whether for assessing an actual or possible state of affairs. The idea is to list the strengths, weaknesses, opportunities and threats/constraints of an existing or potential situation. Strengths and weaknesses apply to the internal aspects of the system itself and the present situation (what is), while opportunities and threats/constraints are associated with the system's environment. This analysis bestows the benefit of supplying a framework of familiar conceptual categories that not only help trigger mental exploration (imagining alternatives), but also starts one along the path toward quantification. SWOC or SWOT analysis can help us better understand a current situation or what might be the expected situation if specific changes were introduced into the system (Wilson, 1992).

2.14.1 Force Field Analysis (FFA).

This is a systems technique sometimes employed when diverging and exploring interrelationships. According to Wilson (1992) it can be a useful means of highlighting and analysing the forces operating on a system. However, once force field analysis becomes a methodology, it has some in-built assumptions, which are open to question, particularly, in the context of agricultural extension. Central to this technique is the brainstorming up of a list of forces in favour of some particular change occurring, and another listing of those forces holding back the occurrence of the change. The next step is to add a ranking of 1 to 5 to indicate the relative importance of a particular force.

Bell and Christiansen (2000) described the use of Force field analysis in extension studies of this nature as important because it emphasises the fact that any event is the resultant of multiple independent factors. It recognises the

need to clearly identify accurately and describe those factors so they can be fairly represented in a balanced assessment of their strength and relative impact on the goal in mind. When the FFA is taken to the third (final) stage, it becomes known as the "change strategy".

Much of the literature on change and its utilisation deal with ideas and suggestions that are meant for practical application. Although these are empirically derived, they are often based on impressionistic evidence. This forms a research methodology of using peoples' perceptions and impressions to derive basic information and inferences about human systems, including agricultural extension systems.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter is a description of the design and methodology adopted for this study. It provides details of the population, sampling procedures, data collection instruments used and the type of data collected in the study. The procedures used for collecting and analysing the data have also been described in this chapter.

The study was conducted in the Central Region of Ghana (See Appendix J). The choice of the region was based on proximity, since the University of Cape Coast is located in the chosen region. The outcome of the study is, however, expected to be applicable to other parts of Ghana since both extension programmes and school curricula are developed and implemented under the same common national policies of the Ministry of Food and Agriculture and the Ministry of Education and Sports respectively.

3.2 Research Design

The study employed the exploratory survey design. The survey was used to collect data on perceptions of randomly selected farmers, agricultural extension agents, district agricultural development officers, headmasters and agricultural

science teachers in junior and senior secondary schools to explore the driving and restraining forces for establishing a school-based extension support system, and the factors that can influence that linkage.

3.3 Population

The study was located in the Central Region of Ghana. Subjects for the survey were taken from the following populations in the region:

I. District agricultural development officers (DDOs) of the Ministry of Food and Agriculture (MOFA).

ii. Agricultural extension agents (AEAs) of MOFA.

iii. Junior and senior secondary schools (JSS and SSS).

iv. J.S.S. and SSS agricultural science teachers.

v. J.S.S. and SSS headmasters.

vi Farmers.

3.4 Sampling for the Survey

Owing to the different sizes of the various populations targeted in the study, different sampling procedures were used to select the samples for each category of respondents. Multistage sampling procedure was used to select samples for most of the respondent categories in the study. This method ensured that the sample sizes were reduced without compromising on representativeness and randomness in the selection. The sampling procedures that were used to select

subjects from the various target populations are described below. The first stage of sampling was the selection of six (6) districts out of the twelve in the region. This was done using the lottery technique of simple random sampling without replacement. The sampling frame was a list of all twelve districts in the Central Region of Ghana. All samples in the study were selected from the various populations in the six selected districts using different sampling procedures depending on the size and distribution of the population.

3.4.1 Selection of District Agricultural Development Officers (DDOS).

All the DDOs in the six selected districts were chosen as respondents. There was supposed to be a maximum of four DDOs in each district according to the new organisational structure of MOFA. However, there were only fifteen DDOs in the six selected districts, and all the 15 were used as respondents because of the small number.

3.4.2 Selection of AEAS

All the AEAs in the six selected districts were used as respondents for the study. Each district was supposed to have a total of 32 AEAs. Therefore there was expected to be a total of 192 AEA respondents. However, there were only 93 AEAs in the 6 districts and all were included in the study.

3.4.3 Selection of JSS Headmasters and Agricultural Science Teachers.

With the assistance of the District Directorates of the Ghana Education Service (GES) in the chosen districts, a sampling frame for Junior Secondary

Schools (JSS) in rural communities was developed for each district. Using the sampling frame, 10 JSS were selected from each of the six districts by simple random sampling. The headmaster of each selected school and all agricultural science teachers in the school were used as respondents. There were 60 JSS headmasters and 87 agricultural science teachers. (Some schools had more than one agricultural science teacher.)

3.4.4 Selection of SSS Headmasters and Agricultural Science Teachers.

All government assisted senior secondary schools in the region except those used for the pilot study were used for the study. These were located in 10 out of the 12 districts in the Central Region. The list of senior secondary schools was obtained from the regional office of the Ghana Education Service in Cape Coast. In each school, the headmaster and all agricultural science teachers were included as respondents in the study. There were thirty-two (32) senior secondary schools, but only 21 were offering elective agricultural science at the period of the study. Therefore 21 headmasters and 46 SSS agricultural science teachers participated in the study.

3.4.5 Selection of Farmers

The sample population for farmers in the study comprised all farmers registered by the local AEAs as their clientele. Simple random sampling was used to select twelve out of the 93 AEAs in the study. Each of the selected AEAs provided a sampling frame from a list of registered farmers in his/her operational area. Thus, farmers whose names were not in the register of the local AEA were

not part of the population sample. Using the sampling frames, ten farmers were chosen by simple random sampling from each of the twelve operational areas, thus providing a sample size of 120 farmers in the study. Table 1 shows the various categories of respondents and their expected sample sizes. A total of 442 respondents were involved in the study.

Table 1.

Respondent Categories and their Sample Sizes

Respondent category	Expected sample size
District agricultural development Officers (DDOs)	15
Agricultural extension agents (AEAs)	93
JSS headmasters	60
SSS headmasters	21
SSS agricultural science teachers	46
JSS agricultural science teachers	87
Farmers	120
Total	442

Source: Data from the study (2004)

3.5 Pilot Study

A pilot survey was conducted (in January to May 2002) in sixteen villages in two districts, namely Cape Coast and Lower Denkyira Districts, to test the questionnaire for reliability and validity. Most of the items in the pilot survey were open-ended and were not coded. The pilot study responses provided possible responses for pre-coding the final study instruments. It also enabled the researcher to delete or modify ambiguous and unreliable items, and to add other suitable items. Responses from the pilot study were used to conduct reliability tests on all the questionnaires based on their internal consistency and inter-item relationships, using the coefficient alpha.

3.6 Instrumentation

There were two sets of questionnaires for the AEAs, agricultural science teachers and the headmasters, while DDOs were given only one questionnaire in the first stage of data collection. Farmers were given one structured interview. The responses to the first set of questionnaires and interview were used to develop the second set of questionnaires. All the questionnaires and interview schedules in the study were designed and pre-tested in the pilot study for reliability. They were content validated by three senior members of the University of Cape Coast.

The first set of questionnaires to the DDOs, AEAs, agricultural science teachers and headmasters in the first stage of data collection, sought to find:

i. Their demographic characteristics (age, education and working experience);

ii. Their perceptions of the prospect for using the school as a centre for an agricultural extension support system;

iii. The roles they expect themselves and the other stakeholders to play in such a system; and

iv. The perceived factors, inputs and conditions that are necessary for the school-based support system.

Each questionnaire contained both open and pre-coded close-ended items. Likert-type scales were developed to determine the perceptions of respondents on the prospect and associated factors and inputs. Wherever it was appropriate, items were presented in a tabular form to simplify the questionnaire.

The second part of the study was to determine the presence or absence, and the strengths or weaknesses of those factors, conditions and inputs perceived by respondents in the first stage of the study as having influence on the prospect of SBESS. Second sets of questionnaires were given to AEAs, agricultural science teachers and headmasters. Likert-type scales were developed to find the attitudes of respondents toward the establishment of SBESS in the JSS and SSS the perceived presence and levels of factors that were perceived as driving forces or restraining forces to SBESS and perceived challenges to SBESS.

Interview schedules were used to interview farmers on their perceptions of the prospect for using the school as a centre for an agricultural extension support system, the roles they expect themselves and the other stakeholders to

play in the system, their interactions with the JSS and the agricultural science teachers and their attitudes toward the establishment of the extension support system in the JSS.

3.7 Variables of the Study

The instruments preparation and data analysis were based on the following variables of the study:

i. Demographic characteristics of major stakeholders in SBESS;
ii. Factors perceived to influence the prospect of SBESS in the JSS and SSS;
iii. Perceived driving forces for SBESS;
iv. Restraining forces against SBESS;
v. Perceived environment required for SBESS;
vi. Perceived input requirement for SBESS;
vii. Existing environments in the JSS and SSS for hosting SBESS;
viii. Existing inputs in the JSS and SSS for hosting SBESS;
ix. Motivation and attitudes of active stakeholders toward SBESS;
x. Perceived roles of active stakeholders in SBESS; and
xi. Perceived challenges to the development of SBESS.

3.8 Data Collection

The main data collection process was in two phases because there were two sets of questionnaires for DDOs, AEAs, agricultural science teachers and JSS

headmasters, which had to be administered at separate times. The first part covered a period of seven months, (February to September, 2003) while the second phase covered five months (February to July, 2004) Data from farmers were collected through personal interview using a structured interview schedule during the second phase of data collection. Selected farmers were individually interviewed in their homes by the researcher.

Questionnaires to JSS headmasters and agricultural science teachers were administered personally by the student researcher in their schools. This method was expensive, slow and tedious, but it was adopted to ensure a high response rate. It also enabled the researcher to observe the school farm and other agricultural facilities the schools used for agricultural practical lessons. The presence of adequate agricultural equipment and a good school farm were two of the factors found to influence the strength for the use of the school as a technology dissemination centre.

Questionnaires to the DDOs and AEAs were personally delivered to them and collected during monthly training sessions for MOFA. This considerably reduced the travelling that would have been involved in contacting AEAs in their operational areas. It also helped to avoid non-completion of questionnaires by the respondents. Agricultural extension policies of MOFA and Ghana Education Service policies that can potentially influence the development of the school-based extension support system were sought as secondary data through library research.

3.9 Data Analysis

Demographic data (age, highest educational qualification and years of working experience) on respondents were organised by SPSS into distribution tables showing frequencies, maximum and minimum scores, valid percentages and means,

Descriptive statistics namely frequencies and percentages were used to analyse demographic characteristics of respondents (Farmers, DDOs, AEAs, JSS and SSS agricultural science teachers and headmasters)

SWOC analysis was done to determine the strengths and weakness of the identified significant conditions and factors associated with the school-based extension support system, thereby serving as driving or restraining forces to the prospect for the school-based extension support system. Identified important factors, inputs and conditions driving or restraining the establishment of an extension support system were rank-ordered using weighted means of their ratings by respondents. Force Field Analysis (FFA) was used to determine and compare the prospect for the school-based extension support system in the JSS and SSS.

Data on expected roles to be played in SBESS by the relevant participants were rank-ordered to indicate what roles were most typically expected from each category of participants. Data on expected inputs, conditions and roles of the various actors in the school-based extension support system, and policies on extension-school linkages, were used to do a SPIRO analysis. This was used to develop the framework for the school-based extension support system

3.9.1 SWOC Analysis

In the second phase of the data collection, a SWOC analysis was done by respondents, in which they rated the existence and strength of each of the factors listed to be necessary for the practice of SBESS on a 5-point scale. Ratings of 4 and 5 indicated strong existence and very strong existence respectively. These were considered as Strength or Opportunity for SBESS. Ratings of 2 and 1 indicated weak existence and very weak existence respectively. These were considered in the study as weakness or constraint for SBESS. A rating of 3 was considered to be neutral, or average existence of the necessary factor. The factors were placed in appropriate quarters in the SWOC diagram as below. The resulting table gave an indication of the factors that are serving as driving forces, and those that are restraining forces for SBESS.

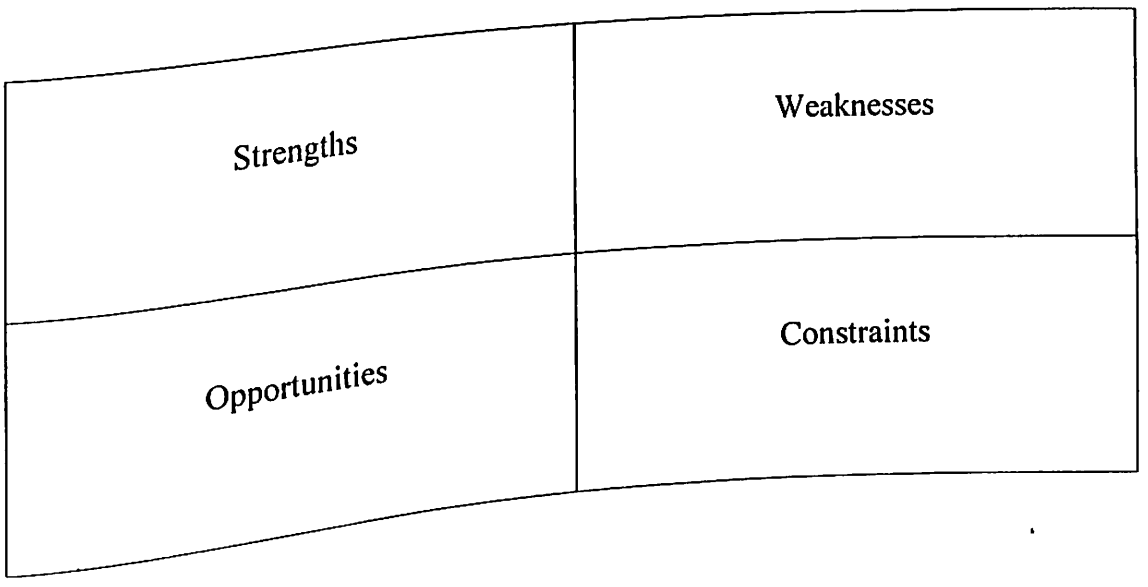


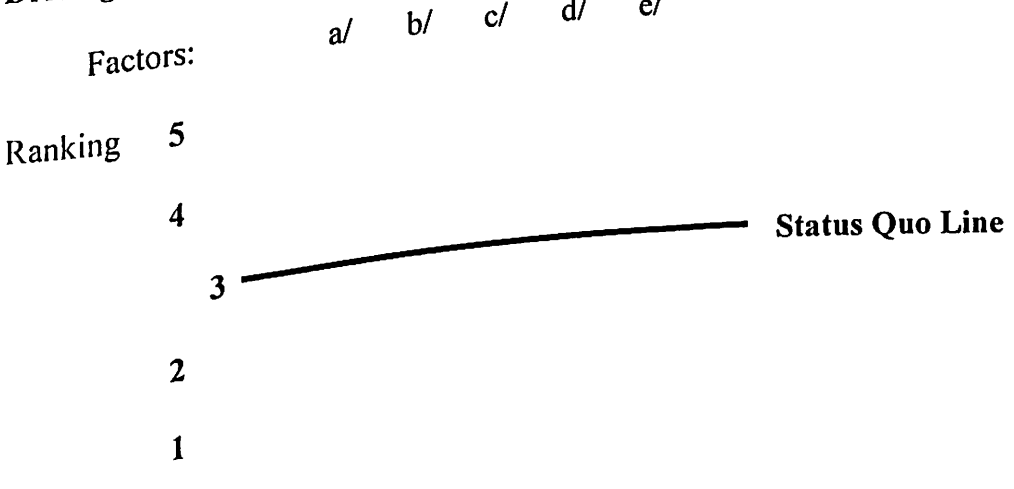
Figure 4. The SWOC Chart

3.9.2 Analysis of Prospect

The analysis of prospect in the study is an adaptation of the Force Field Analysis (FFA) as described by Wilson (1992). The FFA is based on a list of factors (forces) in favour of some particular change or innovation occurring, and another list of factors opposing or holding back the occurrence of the change.

In this study, the list of factors (forces) necessary for the practice of SBESS was obtained from respondents in the first phase of data collection. The rating of the strength of a necessary factor for SBESS by respondents as "high" or "very high" was considered as a driving force. On the other hand, a mean rating of "low" or "very low" was considered as a restraining force. Thus in this adaptation, a neutral ranking of 3 was considered as neutral and was therefore used as the status quo line as illustrated in the chart below:

Driving Forces



Restraining Forces

This adaptation was similar to one used by Bell & Christiansen (2000) in their study of forces affecting the improvement and implementation of international perspectives in Texas secondary school level agricultural programmes.

When the ratings are plotted under the factors, it provides a graph that visually

shows whether the driving forces outweigh the restraining forces or otherwise. The difference between the area under the curve above the status quo line and the area under the curve below the status quo line gives the nature and numerical strength of the prospect.

3.9.3 Computation of Prospect for SBESS

In this study, the researcher developed an empirical structure for analysing the prospect for a proposed innovation based of an adaptation of the Force Field Analysis (FFA) as presented by Wilson (1992). The empirical formula was applied after doing a SWOC analysis of factors that were perceived to be associated with the prospect for SBESS. In the formula, the strengths (driving forces) and weaknesses (restraining forces) of the various factors as rated by the respondents were mathematically forced into numerical denotations that represent the strength of the negative or positive drive.

Using the 5-point rating scale (as in the SWOC analysis) with 3 in the mid-point as the neutral or zero drive (marking the 'status quo" in the FFA) ratings of 4 and 5 were considered as Driving Force and Strong Driving Force respectively. Ratings of 2 and 1 represented Restraining Force and Strong Restraining Force respectively.

The strength of the prospect for SBESS was computed by subtracting the neutral drive figure (3) from each rating, and then summing them all up. The sum is then divided by the number of items (strengths and weaknesses) rated.

$$P = \frac{\Sigma (R - 3)}{N}$$

Where **P** = Prospect level

R = Rating of strength or weakness

N = Number of items (strengths and weaknesses) rated

3 = Neutral strength/weakness

A positive figure for P indicates positive prospect and a negative P is an indication of negative prospect for SBESS. The magnitude of P is an indicator of the strength of the prospect.

CHAPTER FOUR

PRESENTATION AND DISCUSSION OF RESULTS

4.1 Introduction

The results of the study have been presented and discussed in relation to the objectives and the theoretical background of the problem in this chapter. Most of the results are presented in tabular forms and immediately described to highlight the important elements and features, and then discussed. A framework for the development of a school-based extension support system has been created out of the findings. The results have been presented under the following themes in accordance with the specific objectives stated in Chapter One:

i. Staffing strength of agricultural extension District Directorates in the Central Region
ii. Demographic characteristics of major stakeholders in SBESS;
iii. Stakeholders' perceived need for SBESS;
iv. Perceived prospect for SBESS;
v. Factors perceived to influence the prospect of SBESS in the JSS and SSS;
vi. Perceived environment required for SBESS;
vii. Perceived input requirement for SBESS;
viii. Existing environments in the JSS and SSS for hosting SBESS;
ix. Motivation and attitudes of active stakeholders toward SBESS;
x. Participant motivation factors;

xi. Perceived driving forces for SBESS;

xii. Restraining forces against SBESS;

xiii. Institutional challenges of SBESS;

xiv. Perceived roles of active stakeholders in SBESS; and

xv. Framework for SBESS.

A brief summary has been provided at the end of the discussion under each theme.

4.2 Staffing Strength of the Study Districts

The number of agricultural extension personnel in a district in relation to the number of farmers they have to serve is a major factor in the quality and amount of extension delivery to farmers (Carson, 2000). By policy, each district in Ghana is to have four DDOs, and there is supposed to be eight (8) AEAs operating under the supervision of each DDO. In effect therefore, there are expected to be 32 AEAs in each district. The distributions of DDOs and AEAs over the districts studied are shown in Table 2.

Table 2

Distribution of DDOs and AEAs by Districts

District	No. of DDOs	No. Of AEAs
Abura/Asebu/Kwamankese	3	16
Ajumako/Enyan/Essiam	2	16
Asikuma/Odoben/Brakwa	2	11
Assin Fosu	3	17
Komenda/Edina/Eguafo/Abrem	2	17
Mfantsiman	3	16
Total	15	93

Source:Data from the study (2004)

The study revealed, as shown in Table 2, that the number of DDOs and AEAs in all the districts are far below the expected number. Ninety-three (93) AEAs and 15 DDOs respectively, representing 48.4% and 62.5% of the numbers required by policy were found in the 6 districts covered in the study. Although Assin Fosu and Komenda-Edina-Eguafo-Abrem districts had 53 % of their AEA requirement, the Asikuma-Odoben-Brakwa district recorded only 34 % of their AEA requirement. There were 50 % of DDO requirement in three districts, namely; Ajumako-Enyan-Essiam district, Komenda-Edina-Eguafo-Abrem district and Mfantsiman district. This distribution of agricultural extension personnel shows a serious deficiency in the staffing situation in the Ministry of Food and Agriculture with respect to extension. The results show the imbalance in the

extension/farmer ratio reported by Carson (2000). He noted that agricultural extension staff in African countries is grossly inadequate in terms of the ratio of extension staff to farmers. This points to the need to develop extension support systems as means of making extension services accessible to greater proportions of farmers.

4.3 Demographic Characteristics of Respondents (Farmers, Agricultural Science Teachers, AEAS and School Heads)

Respondents in the study, who were also considered as the relevant participants in SBESS, were examined with respect to their age, years of work experience, and level of formal education. These characteristics have been found to be related to people's participation and performance in various agricultural extension programmes, and adoption of innovations.

The importance of age, for instance, has been cited in reports by MASDAR (1997), while farmers' level of education has been found by Fresco (2000) to influence farmers' participation in extension programmes and activities and adoption of innovations. These characteristics, therefore, may have some influences in the perception of the various categories of respondents about the support system being examined for its prospect.

4.3.1 Age

Table 3 shows the age distribution of relevant participants of SBESS

Table 3.

Percent Distribution of Respondents by Age

Age (Years)	Percent Frequency of Respondent Groups						
	AEA	JSH	SSH	JAST	SAST	DDO	FMR
0 – 20	0	0	0	0	0	0	4.2
21 – 30	8.6	6.7	0	9.2	6.5	0	15.8
31 – 40	20.4	25.0	0	24.1	17.4	13.3	26.7
41 – 50	40.9	28.3	19.0	33.3	30.4	40.0	25.8
51 – 60	30.1	40.0	81.0	33.3	45.7	46.7	25.0
Over 60	0	0	0	0	0	0	2.5
Total	100	100	100	100	100	100	100
N=	(93)	(60)	(21)	(87)	(46)	(15)	(120)

Source: Data from the study (2004)

Relevant participants identified for SBESS in the study were of varied age groups. Age is an important factor in the performance, perceptions and abilities of an individual. Farmers in the study were found to have the widest range of age distribution. This was expected because there is no age limitation in becoming a farmer. About 4 percent of farmers were less than 20 years old, while 2.5 percent were older than 60 years (i.e. above retirement age). The ages of most

farmers, however, were apparently spread evenly between 30 and 50 years. The age of farmers is considered to be a very significant factor in agricultural production. The sustainability of SBESS is likely to be influenced by the age distribution observed in the study for the various respondent categories. Also, as expected, the other respondent categories were not above 60 years old because the compulsory retirement age for public employees is 60 years. The study revealed that more than 80 percent of SSS headmasters/headmistresses were less than ten years away from compulsory retirement. All the SSS heads were less than 20 years from retirement. This also applied to more than 86 percent of DDOs in the study. No DDO was below 30 years of age. Generally, SSS heads were older than JSS heads. Most of the respondents in all the categories were over 40 years old.

4.3.2 Years of Work Experience

One of the important stakeholder characteristics perceived to influence the participation and performance in a programme of the nature of SBESS is the years of working experience. Table 4 shows the distribution of the responding SBESS stakeholders by their years of working experience.

Table 4

Percent Distribution of Respondents by Years of Work Experience

Years of Work	Percent Frequency of Respondent Groups						
Experience	AEA	JSH	SSH	JAST	SAST	DDO	FMR
0 – 10	55.9	40.0	57.1	44.8	39.1	13.3	42.2
11 – 20	30.1	45.0	28.6	40.2	41.3	46.7	15.6
21 – 30	10.8	15.0	14.3	12.6	15.2	33.3	0.0
31 - 40	3.2	0.0	0.0	2.3	4.3	6.7	22.2
41 – 50	0.0	0.0	0.0	0.0	0.0	0.0	17.8
Over 50	0.0	0.0	0.0	0.0	0.0	0.0	2.2
Total	100	100	100	100	100	100	100
N=	(93)	(60)	(21)	(87)	(46)	(15)	(120)

Source:Data from the study (2004)

The results show that farmers were the stakeholder group with the widest range of working experience, ranging from one to over 50 years. Majority of the respondent stakeholders had worked for between one and 10 years. For example, more than 50 percent of AEAs and SSS headmasters had worked in that position for between 1 and 20 years. The headmasters had, however, worked in different capacities as teachers for some number of years before becoming heads. But the long years of service of AEAs on the same job points to a possible absence of a systematic system of regular promotions in the Agricultural Extension Service in the Region. Approximately 40 percent of farmers, agricultural science teachers in the JSS

and SSS, and headmasters of JSSS were also within the bracket of one to ten years of working experience. In contrast, 80 percent of DDOs had worked for between 11 and 30 years as senior officers in the Agricultural Extension Service. The compulsory retirement age of 60 years places a limit on the working years for a public worker. Years of working experience is very important in the development and participation in an innovative system such as SBESS, in the sense that experiences gained by a participant in similar (and sometimes entirely different) activities and situations are consciously or unconsciously brought into play. As reported by Campbell and Barker (1997) workers who have worked for many years on a job are more innovative and able to take initiatives. They are, therefore, more likely to break new grounds in their job performance than their less experienced counterparts. This stresses the importance of work experience in the ability of workers to use innovative ideas to enhance their performance. Experiences of the relevant participants of SBESS in participation in similar programmes, therefore, would be a likely advantage in the smooth implementation of the system. Farmers have no limitations in extending their years of work experience, because they may choose to remain on the job for as long as their health and strength could permit them. Therefore, experienced farmers will not be scarce in SBESS.

4.3.3 Level of Formal Education

Different types and levels of formal education are required to work in different organisations and in different capacities. The various groups of stakeholders in SBESS are, therefore, expected to have varying levels of

education and this could influence their performance, level of cooperation and acceptance of innovative ideas. Table 5 shows the distribution of respondents in the study according to their educational levels.

Table 5

Percent Distribution of Respondents by Level of Formal Education

Highest	Percent Frequency of Respondent Groups						
Level of	AEA	JSH	SSH	JAST	SAST	DDO	FMR
No formal educ.	0.0	0.0	0.0	0.0	0.0	0.0	47.5
Primary	0.0	0.0	0.0	0.0	0.0	0.0	40.0
Middle/JSS	0.0	0.0	0.0	0.0	0.0	0.0	8.3
SSS/Tech/com.	0.0	0.0	0.0	8.0	0.0	0.0	2.5
Trs./Agric Cert	95.7	51.7	0.0	69.0	8.7	0.0	1.7
Poly/ Diploma	4.3	31.7	0.0	20.7	43.5	46.7	0.0
Degree	0.0	13.3	47.6	1.1	43.5	46.7	0.0
Higher	0.0	3.3	52.4	1.1	4.3	6.7	0.0
Total	100	100	100	100	100	100	100
N=	(93)	(60)	(21)	(87)	(46)	(15)	(120)

Source:Data from the study (2004)

An examination of the educational background of respondents shows that there is generally a low level of formal education among farmers in the Central Region. Forty-seven percent of farmers had no formal education, while 40 percent had just up to primary school education. Only 4.2 percent of respondent farmers

had senior secondary and post- senior secondary education. The results suggest that attitudes of young educated Ghanaians in the region towards taking up farming as their career have not changed much over the years, thus, leaving a concentration of illiterates to take up the challenge of producing the nations food and fiber. Twum-Barima (1977) and Blege (1986) observed that when young people acquired education, they were not willing to take up farming as their occupation – even those who had been trained specifically to go into farming. Farming, thus, continues to attract very few highly educated people in the region.

This problem is capable of affecting the adoption of agricultural innovations, as observed by Chung (1991) that literacy level among farmers is highly correlated with the utilisation of modern technology. In effect, communities whose farming population is better educated are more likely to adopt and use innovative technologies for agricultural production. Röling, (1995) noted that the quality of innovativeness in farming is clearly related to the level of formal education of the farmer and the competency of the agricultural extension workers. According to Brynes & Brynes (1978), a farmer's level of education, to some extent, determines the types of tasks he/she is capable of undertaking in any programme, and therefore his/her level of participation. Farmers with low education, therefore, require greater extension efforts to attract them to participate in innovative programmes and help them accept and use improved technologies.

If low educational level of farmers is to be prevented in the future, then the youth of today must have the desired level of education while still young. Chung (1991) noted that efforts to raise agricultural production in Zimbabwe have been partly concentrated on providing the youth in school with the needed

knowledge and skills that are closely linked with existing realities in the farming occupation. It is anticipated that innovative systems such as SBESS can be a suitable response to the situation, because, according to Gorton, (1980) education affords the farmer the opportunity to pry for more information on new technologies and to better understand and be more receptive to advice from extension agents. Greater levels of participation are expected in SBESS from the few higher educated farmers in the various communities, because Cernea (1991) found that farmers with a higher level of education are expected to be able to participate more in extension programmes. This should serve as a guide in selecting leaders for the farmer groups.

Educational levels of school heads and agricultural science teachers in both JSS and SSS were quite high, although the SSS had higher educated heads and teachers than the JSS, as expected from the policy provisions of the Ministry of Education and Sports. Only seven JSS agricultural science teachers in the JSS (8 percent) did not have post- senior secondary education. All SSS headmasters/ headmistresses and 16.6 percent of heads in the JSS had first degrees or higher education.

Higher education among agricultural extension officers has been associated with greater competency by a number of extension researchers. Adewumi (1976) for example, observed that extension workers with Bachelor degrees rated themselves as less competent than those with Masters degrees. Majority of AEAs in the study (95.7 percent) stated their highest education as the General Agriculture Certificate obtained after a three-year training in the country's Agricultural Colleges run by the Ministry of Food and Agriculture. Only four AEAs had

obtained Diploma certificates and none of the AEAs in the study had a degree. The explanation was that higher educated extension personnel were removed from the frontline to the district and regional offices of the MOFA to serve as Development Officers. Others left the Ministry of Food and Agriculture to work with other organisations that offered them better remuneration and conditions of service. Thus the remaining frontline staff have rather low levels of education. This agrees with observations by Knipscheer, Zinnah, and Mutimba (2002), FAO, (1996, 1997), Kwarteng, Zinnah, and Ntifo-Siaw (1998), Zinnah, Steele, and Mattocks (1998) and van den Ban (1997) that a large proportion of extension staff in sub-Saharan Africa have low levels of education. In the view of Opio-Odongo (2000), the situation hinders professional interactions with researchers, and hampers extension organisations in incorporating participatory approaches in agricultural and rural development programmes.

The implication is that farmers are deprived of the expertise of highly educated extension workers. It should be possible for the ministry to put more degree-holding extension officers from the nation's universities to the frontline under improved service conditions to share their expertise directly with farmers, and young people in schools. This would earn them the necessary self-confidence and respect among the school-going youth that would facilitate their educational work in the local schools and among the farmers. For example, through the SAFE programme which trains AEAs to obtain diplomas and degrees from the Kwadaso Agricultural College and the University of Cape Coast, agricultural extension agents have been specially trained to offer direct services to farmers, in a more farmer-centered manner. Such personnel must not be kept away from

farmers. In SBESS, it is anticipated that high education levels and age among AEAs, heads of schools and DDOs are desirable characteristics for their intended supervisory roles.

4.4 Stakeholders' Perceived Need for Extension Support System

One major constraint discovered to militate against agricultural extension delivery in Ghana is the very low extension–farmer ratio. The situation is such that several farmers do not have access to extension services, so they are left behind in the adoption of useful agricultural technologies. Chung (1991) noted that the benefits of the agricultural extension system are seriously hampered by the small numbers of extension workers relative to the huge numbers of farmers in the rural communities. The situation creates a demand among stakeholders in extension for credible and sustainable extension support systems that are capable of using other innovative avenues to reach farmers. The perception of respondents in this study on the need for an extension support system was examined to determine whether stakeholders perceived the envisaged school-based extension support system (SBESS) to be relevant. Table 6 shows mean ratings of the need for the support system as perceived by the various categories of respondents, along a five–point scale ranging from "not needed" to "very much needed".

Table 6

Perceived Need for an Extension Support System

Category of Respondent	Mean Rating of Need for Support System	Interpretation
AEA	4.20	Very much needed
JSH	3.41	Needed
SSH	3.02	Needed
JAST	4.01	Very much needed
SAST	2.83	Not much needed
DDO	4.55	Very much needed
Farmer	4.64	Very much needed
Mean	3.81	Much needed

SE = 0.6249

Source: Data from the study (2004)

The result on Table 6 shows a high rating for the importance of an extension support system for agricultural extension in the Central region. On the average, respondents perceived an important need for the support system. An observation of the group ratings indicate that AEAs, agricultural science teachers in the JSS, DDOs and farmers rated the need for the support system as very important, while all the other groups, except agricultural science teachers in the SSS rated the need as important. Senior Secondary School agricultural science teachers rated the

need for an extension support system as of little importance. This again shows a deviant trend of interest in the envisaged system by agricultural science teachers in the SSS. The perception of this group of respondents predicts that they will not willingly participate in SBESS, hence the prospect of SBESS in the SSS becomes uncertain.

4.5 Relevant Participants of SBESS

The relevant participants in SBESS considered by respondents in the study have been shown in Table 7. Relevant participants are those categories of people who need to be essentially included in SBESS activities. Table 7 shows the percentage of respondents that considered each category of stakeholders as relevant participants. The following abbreviations have been used in the table:

AEA	Agricultural extension agent
DDO	District agricultural development officer
FMR	Farmer
JAST	JSS agricultural science teacher
JSH	JSS headmaster/headmistress
SAST	SSS agricultural science teacher
SSH	SSS headmaster/headmistress
STD	Student

Table 7

Percent Distribution of Respondents Perceiving SBESS Participants as Relevant

Perceived Participants	Category and Percentage of Respondents recognising Relevant Participant								
	AEA	JSH	SSH	JAST	SAST	DDO	FMR	Mean	SD
AEA	100	100	100	100	100	100	100	100	**0.0**
JSH	40.9	40.0	0	33.3	30.4	33.3	42.2	31.4	**14.6**
SSH	30.1	28.3	0	24.1	30.4	13.3	15.6	20.3	**11.3**
JAST	100	100	100	100	100	100	100	100	**0.0**
SAST	40.9	53.3	85.7	91.0	39.1	46.7	15.6	46.0	**26.7**
DDO	20.4	6.7	14.3	33.3	45.7	33.3	37.8	27.4	**14.0**
STDS	61.9	93.3	57.1	57.4	76.1	80.0	75.6	71.6	**13.4**
FMR	100	100	100	100	100	100	100	100	**0.0**
N=		(93)	(60)	(21)	(87)	(46)	(15)	((120)	

Source: Data from the study (2004)

In Table 7 the percentage of the various respondent groups who rated identified groups of participants as important participants of SBESS are displayed. Categories rated as important are those groups who respondents feel must be actively involved in SBESS activities. The results show that agricultural extension agents (AEAs), agricultural science teachers in the JSS (JASTs) and farmers were considered by all categories of respondents as important participants.

For each of these groups, 100 percent of all respondent categories indicated that they should be important active participants. Students were considered as important by 71.6 percent of all respondents, indicating that they were also highly favoured as important SBESS participants.

Heads of Senior Secondary Schools (SSH) did not perceive themselves or their counterparts in the Junior Secondary Schools as important participants at all in SBESS, although about 30 percent of AEAs and SSS agricultural science teachers rated them as important participants. Heads both of Junior and Senior Secondary Schools were not considered as important participants although heads of Junior Secondary schools were rated higher (31.4 %) than heads of Senior Secondary Schools (20.3%). This could be attributed to the general perception that the SSS were more obsessed with academic pursuits than vocational activities that are not directly going to improve examination scores of their students. Several people, including heads and teachers of the SSS believe that the SSS is purely academic in its orientation. This is consistent with an observation by Ntifo-Siaw (1993) that the content of pre-service education of agricultural extension agents in Ghana is largely academic in nature.

Following the same trend as the rating of the school heads, agricultural science teachers in the JSS were perceived as more important participants in SBESS than SSS agricultural science teachers. While all respondents considered JSS agricultural science teachers as important participants, only 46 percent considered SSS agricultural science teachers as important in SBESS. This is a further confirmation that most people perceive the SSS as remote from what goes on in real life agriculture. The urban location of most SSS has contributed to

this perception.

It could be inferred from the result (Table 7) that SBESS must essentially involve farmers, students, agricultural extension agents, and agricultural science teachers in the junior secondary schools. Senior secondary school agricultural science teachers were considered as less likely participants although they generally have higher education in agriculture than the JSS agricultural science teachers. This finding was in contrast with popular opinion that agricultural science teachers in the SSS have relatively higher knowledge in agriculture, and would therefore be more capable of handling farmers' agricultural problems than the JSS agricultural science teachers. Research has found that people who teach in the lower levels of education have the necessary capacity and motivation to adequately engage in rural extension activities. This means that JSS agricultural science teachers have the necessary competency to assist farmers in solving their agricultural problems. Leonard (1977) found in Kenya that agricultural extension agents who have only attained the upper primary education have a clear tendency to know more and to explain better than those with either secondary education or only lower primary schooling. He notes that this curvilinear tendency is evident in all technical areas of agricultural extension. However, the more complicated a skill is, the higher the educational level at which the best performance can be achieved. This implies that, although it is possible for agricultural science teachers in Junior Secondary Schools to adequately influence the dissemination of simple farming technologies in the farming communities, the more complicated problems would require the attention of agricultural experts. with the members of the community. This could account for the reluctance of respondents to perceive them as suitable partners in

SBESS. The JSS, on the other hand, are mostly community-based and the teachers live within the communities as members. Farmers would, therefore, be more comfortable with referring their agricultural problems to them, and local AEAs would find it easier to plan and implement programmes and activities with them.

4.6 Perceived Prospect for the School-based Extension Support System

Table 8 shows a summary of the mean perception of farmers, DDOs, school heads, agricultural science teachers and AEAs of the prospect for SBESS.

Table 8

Stakeholders' Perception of the Prospect for SBESS

Category of Respondents	Perceived level of prospect in JSS		SSS	
	Ranking	Interpretation	Ranking	Interpretation
AEAS	3.76	High	3.58	High
DDOS	3.96	Very High	3.70	High
JASTS	3.84	Very High	-	-
SASTS	-	-	3.70	High
JHEADS	3.80	Very High	-	-
SHEADS	-	-	3.50	High
MEAN	3.84	Very High	3.62	High

Source: Data from the study (2004)

The results show that all the respondent groups perceived SBESS as having high prospect, although they were of varying educational and occupational backgrounds. This reveals a high level of confidence held by farmers and agricultural extension workers who are not in the formal education system in the capacity of schools to participate in extension delivery programmes. It also implies that apart from realising the potential of their schools to participate actively in extension activities, schoolteachers are open to AEAs' interventions in agricultural curricula in the schools.

SBESS was perceived by all categories of stakeholders as having very high prospect in the JSS, and high prospect in the SSS. All the categories of respondents rated the JSS as a more suitable base for SBESS than the SSS, with mean ratings of 3.84 and 3.62 respectively. Agricultural science teachers and heads in the JSS could not offer ratings for the SSS, and similarly, SSS heads and agricultural science teachers could also not give ratings for the JSS. The results indicate that DDOs had the strongest view that SBESS would be feasible, and more appropriate in the JSS(rating: 3.96 and 3.70 respectively). Rationalization of the ratings of respondents was based on several factors perceived by respondents to influence of prospect of SBESS , as displayed in Table 9.

4.7 Factors Perceived by Stakeholders to Influence the Prospect of SBESS

The way stakeholders perceive a system has major a impact on the success of the system's programmes and activities. Gorton (1980) noted that innovations vary in complexity, financial cost, ease of communicability, and compatibility

with the other phases of operation in their various extension systems and environments. As a result, the difficulty levels in introducing innovations also vary. Thus the introduction of SBESS as an innovative extension support system is expected to have its own sets of challenges and shortcomings, and various categories of participants and stakeholders are likely to perceive these attributes in different ways. Gorton (1980) again asserts that the success of an innovation depends on materials within the innovation which possess special characteristics such as highly motivating, self-instructing, and very attractive materials. These must be made available always and in adequate quantity to enhance adoption.

The study identified several factors perceived to influence the prospect for SBESS. Table 9 shows the major factors perceived by AEAs, Agricultural science teachers in JSS and SSS, heads of JSS and SSS, and District Agricultural Development Officers as influencing the prospect of SBESS. The absence or presence of any of the listed factors was perceived to contribute to the prospect of SBESS. The list of factors and their rated importance, therefore, offers a logical means for assessing the prospect of SBESS systemically. Factors that were considered as important have been listed in Table 9 in order of descending ranking of importance.

Table 9

Factors Perceived to Influence SBESS by Various Stakeholders

Factor as rated by:	Perceived Strength of influence							
	AEA	JSH	SSH	JAST	SAST	DDO	**Mean**	**SD**
Stakeholders' perception of prospect	3.8	3.5	3.8	3.8	3.9	4.0	**3.8**	**.16**
AST's available time	3.2	3.6	3.6	3.4	3.2	4.0	**3.5**	**.30**
AEA motivation	3.5	3.3	3.4	3.2	3.4	3.5	**3.4**	**.12**
Funding	3.3	3.1	3.3	3.4	3.3	3.8	**3.4**	**.23**
FBOs in community	3.3	3.1	3.3	3.2	3.2	3.5	**3.3**	**.14**
Good school farm	3.4	3.1	3.2	3.2	3.3	3.5	**3.3**	**.15**
AST motivation	3.5	3.2	3.2	3.2	3.3	3.3	**3.3**	**.12**
Attitude of farmers	3.5	3.1	3.1	3.1	3.3	3.6	**3.3**	**.22**
Knowledge of Roles	3.5	3.2	3.2	3.1	3.2	3.5	**3.3**	**.17**
Competency of AST	3.5	3.3	2.8	3.2	3.5	3.5	**3.3**	**.28**
Attitude of AEA	3.4	3.2	3.1	3.0	3.2	3.1	**3.2**	**.13**
AEA & AST Cooperation	3.5	3.0	2.9	3.0	3.1	3.5	**3.2**	**.27**
Closeness of School farm	3.3	3.1	2.8	3.1	3.1	3.4	**3.1**	**.21**
Competence of AEA	3.3	3.0	3.1	3.0	3.0	3.4	**3.1**	**.15**
Attitude AST	3.2	3.1	2.8	3.1	3.1	3.4	**3.1**	**.19**
Active school clubs	3.2	3.0	2.9	3.1	3.0	3.3	**3.1**	**.15**
Educational level of AST	3.5	3.0	2.6	3.0	3.1	3.3	**3.1**	**.31**
Farmers' Educational level	3.4	2.7	2.5	2.9	2.9	3.6	**3.0**	**.42**
Supervision	3.1	2.6	2.8	3.0	2.8	3.5	**3.0**	**.31**
n=	(93)	(60)	(21)	(87)	(46)	(15)		

Source: Data from the study (2004)

KEY

0 – 1.4 = Not important

1.5 – 2.4 = Of little importance

2.5 – 3.4 = Important

3.5 – 5.0 = Very important

The result in Table 9 shows a ranking of nineteen important factors identified in the first phase of the study to influence the prospect for SBESS, in a descending order of importance. These were: (1) Stakeholders' perception of prospect for SBESS, (2) agricultural science teachers' available time, (3) AEAs' level of motivation, (4) funding, (5) availability of farmers' groups in the SBESS communities, (6) availability of good school farm, (7) agricultural science teachers' level of motivation, (8) attitude of farmers, (9) participants' knowledge of roles to play, (10) competency of agricultural science teachers, (11) attitude of AEAs, (12) cooperation between AEAs and agricultural science teachers, (13) closeness of school farm to the community and school premises, (14) competency level of AEAs, (15) Attitude of agricultural science teachers, (16) presence of active school clubs, (17) educational level of agricultural science teachers, (18) educational level of farmers, and (19) supervision. The most important factor perceived to influence the prospect for SBESS was the perception of stakeholders about its feasibility. This confirms the recognition of the important role stakeholders' perception about a programme plays in its success by Gorton (1980). It is an indication of their confidence in the system they expect to be implemented. When stakeholders are convinced about the prospect of an innovation, they are

likely to contribute effectively toward its implementation. This perception must be determined when assessing the prospect for SBESS. Unfortunately, however, the input of the rural farmer in planning such programmes with respect to his perceptions on recommended practices and approaches, is almost non-existent. This situation may be accountable for most of the failures of agricultural programmes in the rural communities (Deshler and Sock, 1985).

The second most important perceived factor was the time available for agricultural science teachers to engage themselves and their students in SBESS activities. This factor makes reference to the school curriculum and timetable. It implies that the curriculum must be able to accommodate SBESS activities without sacrificing its quality. Also teachers must not be over-tasked with respect to their official and personal time when they decide to participate in SBESS.

Funding was regarded as an important factor in the determination of SBESS's prospect. Many plans for innovative systems fail because they are not viable in terms of cost, time and frustration, without immediate gains. Thus, apart from a good financial plan, consideration of the time of participants, their tolerance levels before they get frustrated and the observability of the advantages must all be actively taken into consideration in determining the prospect for SBESS

Personal attributes of the relevant stakeholder, that were considered as important factors include the levels of motivation of agricultural science teachers and AEAs. The motivation of both AEAs and agricultural science teachers were rated as important factors in SBESS (3.4 and 3.3 respectively). This agrees with earlier findings on worker motivation including Leonard (1977), Costley and Todd (1987), who identified the strength of motivation as a factor in determining

what a worker can do to create a change. Motivation itself has been associated with several determining factors such as recognition, status appraisal, and job satisfaction (Bucher, 1985; Costley & Todd, 1987). Efforts to motivate AEAs and agricultural science teachers as a means of increasing the prospect of SBESS must be done cautiously. Although several workers call for incentives and as a means of improving worker motivation, the findings of Brayfield and Crockette (1985) show that incentives have little influence on worker motivation. Porter and Lawler (1988) argued that it is the performance of the job itself rather than incentives that could motivate the worker. Despite these findings, the findings of Cascio (1989) and Chellandurai (1985) would have to be taken into consideration in order to factor into SBESS appropriate levels of rewards to serve as extrinsic motivation. Cascio found a 30 percent increase in workers' job performance when appropriate incentives were given. Chellandurai explained that giving workers appropriate rewards such as good salaries and bonuses ensures that their physiological needs are satisfied, and this largely satisfies them. According to Maslow, employees have five levels of needs (Maslow, 1943): physiological, safety, social, ego, and self- actualizing. Maslow argued that lower level needs (physiological needs) had to be satisfied before the next higher level need would motivate employees.

The educational levels of all categories of relevant participants and their attitudes towards the programme at stake were rated as important factors that could determine the prospect of SBESS as an agricultural support system. Also rated important were AEA's and agricultural science teachers' perceived competencies and the knowledge of the roles all the relevant stakeholders have to play as participants in SBESS.

The presence of farmer groups/organisation in the community was perceived as an important factor for SBESS. The idea of farmer-based organisations in farming communities is not unfamiliar to Ghanaian farmers, especially in the Central Region. Older farmers in particular, in the 1960s, saw the formation of farmers' cooperatives as a means of accessing credits, marketing produce and generating capital. It eventually culminated in the birth of the United Ghana Farmers' Cooperative Council to organise small-scale farmers to take advantage of mechanised agriculture through cooperative efforts. The cooperative system was marred with several organisational malpractices and embezzlements by the elite clerks and leadership of the groups. This killed the cooperative spirit in several farmers, and has continued to pose problems to extension agents in their efforts to work with groups. The formation of groups has recently received some impetus with the operations of some NGOs in the various communities. Most of these NGOs will offer assistance and support to farmer groups, and not individuals. The provision of financial and technical support serves as an incentive for group formation. Unfortunately, majority of such groups collapse immediately the financial support is withdrawn. It is assumed that when farmers are in a group, they are more likely to work closely with AEAs. Unfortunately, in this study, all the farmers were in groups, because the sampling frame used to select subjects comprised farmers listed by the local AEA in each selected community. This could give a distorted picture of the situation of farmer groups in the study area.

Of similar importance with farmers groups is the existence of agricultural clubs in schools that seek to organise students to voluntarily engage in agricultural projects and services. Phipps (1972) noted that school agricultural clubs are

essential tools for generating good farm attitudes and skills to young people in school. It was perceived that voluntary spirited members of agricultural clubs in the schools would serve as ready hosts to farmers visiting SBESS sites at their leisure. Members of the club could also offer assistance to the agricultural science teacher and AEA as they prepare for SBESS activities.

The nature and enforcement of policies and institutional arrangements were perceived to be important factors to be considered when assessing the prospect of SBESS. The system must be legal and acceptable within the institutional framework of the communities in which they may be practiced, as well as the two public institutions engaged in it, namely the schools and the agricultural extension department of the Ministry of Food and Agriculture. The policies of the two ministries have to be examined and exploited to enhance the prospect of the support system. Although not actively pursued, the T&V system of extension operated in Ghana makes provision for AEAs to work with the local schools to bring the pupils and staff abreast with current innovations in agriculture. Although some attempts have been made at one time or the other by the MOES to strengthen the teaching of practical agriculture in the schools through various curriculum reforms and enrichment programmes, and the MOFA to include some rural schools as part of their training targets, these have been paralysed by the top-down nature of the school curricula and examination systems adopted by the ministry of education and sports (MOES), and the similarly top-down approach of the extension system itself. In 1997 for instance, a committee was commissioned to examine key elements in the reforms in agricultural education and make recommendations to the then existing agricultural science curricula at the

various levels of education to promote the development of commercial agriculture in Ghana (Djangmah, Aidoo, and Asiegbor, 1997). Such efforts at linking agricultural development to school agriculture provide a favourable policy environment for SBESS. For instance, in their recommendations, they drew attention to the need to increase the practical content of agriculture in the basic schools, and that MOFA should review jointly with MOES, the vocational agriculture programme in the teacher training colleges to ensure that the teachers they produce are able to handle vocational agriculture effectively in the basic schools. SBESS has the potential to generate interest and debate on formulating new policies that will officially link basic and secondary schools with agricultural extension programmes and activities.

Respondents in the study perceived the adequacy of agricultural equipment in the schools as an important factor in the prospect of SBESS. This reveals the conception usually held among extension agents and farmers that improved technologies must go with improved equipment. It implies that schools going to host SBESS would need to be properly equipped for various field demonstrations.

Knowledge of roles to play (role clarity) by the relevant participants was found to be associated with the prospect for SBESS. A good knowledge about roles one has to play in a situation enables the one to prepare and critique the system in the light of the performances expected from the various actors. Lack of role clarity on the other hand may lead to confusion and frustrations in the system, and standards for evaluation would be difficult to generate. Respondents also pointed to the need for cooperation between AEAs and agricultural science teachers. Schools in which SBESS will be based must possess suitable school

farms, because the presence of a suitable school farm was rated as an important determining factor in the prospect of SBESS. The distance of school farms from the schools' premises was also considered as an important factor for SBESS. Farms that were very far away from the school would attract less frequent visits from all categories of relevant participants in SBESS. Time would also be wasted in commuting to such distant farms. School farms should preferably be quite close to the school and the community. Student's agricultural clubs in the schools was perceived to be an important factor. Supervision was also noted by respondents to play and important role in determining the prospect of SBESS. The presence or absence of all the identified factors therefore had to be analysed quantitatively to determine the prospect strength of SBESS.

4.8 Perceived Input Requirement, (Training, Equipment, and Curriculum)

Perceptions of respondents on the schools' requirements for inputs such as agricultural facilities and equipment, training needs, and curricular modifications were examined. Table 10 shows the most important perceived requirements listed in order of descending frequency. (A requirement was considered as important if it was mentioned by at least 30 percent of respondents). More than 74 percent of respondents noted in each case that schools in which SBESS would be based were expected to have school farms, students' agricultural clubs, and adequate number of simple agricultural tools. Schools must have farm assistants (73.4%) and poultry house with the necessary accessories such as brooder house, feeders, watering troughs and feed stores (66.51). There must be apiary, snailery, pens for small

ruminants, and well equipped science laboratory. Some conditions forming the environment of the support system were required to be present. These have been placed under the subheading "curriculum and conditions" in Table 10.

Table 10

Percent Frequency Distribution of Respondents by Perceived Required Input and Conditions for SBESS

Perceived Requirement	%Frequency
Equipment/facilities	
School farm	76.25
Students' agricultural clubs in schools	74.82
Simple farm tools (watering cans, hand tools, etc.	74.11
Farm assistants	73.40
Poultry house & accessories	66.51
Apiary	60.81
Snailery	58.43
Pens for small ruminants	50.59
Well equipped science laboratory	49.64
Curriculum and conditions	
Farmers group(s) in Community	70.13
Favourable internal and external school policies	62.23
Favourable extension policies	59.61
1 day in the week fully devoted for field work for agric students	50.12
Students and staff trained to receive visiting farmers	48.93
Other members of school staff aware & involved in planning.	33.02

Source: Data from the study (2004)

Respondents' views were that:

1. There must be a farmers group in the SBESS community. The presence of farmers' group in farming communities had also been identified as a major factor in determining the prospect for SBESS.
2. SBESS schools required favourable internal and external school policies (Over 62 and 59 percent responses respectively).
3. At least a day must be allocated on the school agriculture timetable for practical field work, and for farmers' visits (50.12 percent responses). This day preferably could be a non-farming week-day, so that farmers could visit and interact with the students and agricultural science staff without curricular hindrance. Such an arrangement contributes to favourable internal school policies.
4. Students in SBESS schools must be trained to receive and direct visiting farmers to SBESS site, and to discuss problems and activities with them (48.93%) and finally,
5. Other members of staff in the schools apart from the agricultural science teacher must be made aware of, and involved in, the planning of SBESS programmes. (33.02)

4.9 Presence and Suitability of School Farms for SBESS

According to FAO (1997), school farms are essential tools for the teaching of vocational and pre-vocational agriculture at all levels of formal education. In this study, the number of schools with school farms in the Central Region and

the suitability of these farms as perceived by the agricultural science teachers in the various schools were determined as shown in Table 11.

Table 11

Frequency Distribution of Schools With Suitable School Farms for SBESS

Suitability of School Farm	JSS		SSS	
	No.	%	No.	%
No school farm	23	38.3	0	0.0
School farm in poor condition	12	20.0	15	71.4
School farm very far away from school & town	3	5.0	1	4.8
Good school farm	22	36.7	5	23.8
Total	60	100	21	100

Source: Data from the study (2004)

The result shows that all the Senior Secondary Schools (SSS) in the study have school farms. This is not strange since all the SSS selected were chosen from a population of schools that did elective agriculture. However, only 23.8% of the farms were considered as good school farms. About 71 percent of the school farms in the SSS were in poor condition, while only one (4.8%) farm was far away from town, thus making visits to the farm and hence learning from the farm by farmers very difficult and tedious.

Twenty-two JSS representing 36.7 percent have good school farms that are adequately suitable for SBESS. Over 38 percent of JSS do not have school farms

at all. Twenty percent of the JSS have school farms are not in good conditions while 5% percent have school farms that are very far away from the school compound. Thus, about 37 percent of JSS have school farms considered to be adequately suitable for SBESS. Comparing the school farm situations in the JSS and SSS reveals that although many JSS do not keep school farms, those that have farms keep them in better conditions for learning purposes than the SSS, most of which are not able to keep their farms in satisfactory condition. It is, thus, inferred from the results that a greater proportion of JSS school farms than SSS farms are suitable for SBESS. This again puts the JSS ahead as a more prospective base for SBESS than the SSS. Therefore, the absence of school farms in over 38 percent of the JSS is a weakness for the prospect of SBESS and also for achieving the goal of teaching pre-vocational agricultural skills in the JSS. It is an indication that the practical component of JSS agricultural science teaching has been overlooked, or inadequately tackled.

The preferred use of the JSS as the base for SBESS requires that every JSS should have a satisfactory school farm that can be conveniently and sustainably used to address the technological needs of students and the communities in which they exist. It is ,therefore, necessary for head teachers, agricultural science teachers, AEAs and community leaders, to join hands and assist all JSSs to acquire school farms and agricultural equipment for agricultural education.

4.10 Existing Consultations among Stakeholders

One of the major criticisms of the agricultural education system in Ghana has been the lack of linkages and consultations among personnel in the two major ministries concerned with agricultural education, namely the Ministry of Food and Agriculture and the Ministry of Education and Sports. However, according to Swanson and Samy (2000), real linkages and collaborations must exist among the grassroots, in order to create the needed change in attitudes and actions that will fit the changing global scene of agricultural production. The attitudes of farmers, agricultural science teachers, and AEAs have been found in this study to exert important influences on the opportunities for a successful SBESS. The frequency at which there is interaction among these major stakeholders identified in SBESS contributes in the harmonisation of their views, goals and actions. The study sought to find the amount of consultation between AEAs and agricultural science teachers, farmers and agricultural science teachers, and between farmers and AEAs. Consultations referred to in this section are restricted to those interactions that concern agriculture only. The perceived frequencies of consultations by stakeholders among themselves have been shown in Tables 12 to 16 below. Table 12 shows the frequency at which AEAs perceive their consultations with JSS and SSS agricultural science teachers to share opinions, technological knowledge and innovations.

Table 12

AEAs Perceived Frequency of Consultation with JSS and SSS Agricultural Science Teachers

	Consultations with			
	JAST		SAST	
Perceived Level Of consultation	Frequency	Percent	Frequency	Percent
Very Frequent	0	0.0	0	0.0
Frequent	0	0.0	0	0.0
Occasional	12	12.9	1	1.1
None	81	87.1	92	98.9
	93	100	93	100

Source: Data from the study (2004)

The prospect for the smooth take-off of SBESS have been found in this study to be influenced by the level of interaction between AEAs and agricultural science teachers in the local community. The results revealed that AEAs perceived the level of interaction between themselves and agricultural science teachers as very low. None of the AEAs perceived their interaction with agricultural science teachers in either SSS or JSS as very frequent or frequent. While 12.9 percent indicated level of consultation with agricultural science teachers in JSS as occasional, all the remaining 81 percent had never consulted with any JSS agricultural science teacher. Only one out of 93 (1.1%) AEAs had made some occasional contacts with SSS agricultural science teachers concerning

agricultural activities. This shows that AEAs favour working with JSS agricultural science teachers more than with the SSS teachers. Table 13 shows the frequency distribution of farmers with respect to their perceived frequency of consultation with agricultural science teachers.

Table 13

Farmers' Perceived Frequency of Consultation with JSS and SSS Agricultural Science Teachers and AEAs

	Consultations with					
Perceived Level	JAST		SAST		AEAs	
Of consultation	Freq.	%	Freq.	%	Freq	%
Very Frequent	0	0.0	0	0.0	82	68.3
Frequent	14	11.6	0	0.0	32	26.7
Occasional	53	44.2	0	0.0	6	5.0
None	53	44.2	120	100.0	0	0.0
N=	120	100.0	120	100.0	120	100.0

Source: Data from the study (2004)

Farmers were found to perceive themselves having more frequent consultation with JSS agricultural science teachers than with SSS agricultural science teachers. About 12 percent of farmers said they had frequent consultations with JSS agricultural science teachers, and 44.2 percent occasionally consulted JSS agricultural science teachers for agricultural advice. However, 44.2 percent did not consult any JSS agricultural science teacher. This means that about 56

percent of the respondent farmers have had consultations with JSS agricultural science teachers, thus showing an average level of confidence in the ability to of JSS agricultural science teachers agricultural science teachers to handle technical issues in agriculture. On the contrary, none of the farmers had consulted any SSS agricultural science teachers for technical advice or information in agriculture.

The study revealed that farmers perceived their interactions with AEAs as very frequent and far more frequent than they had with agricultural science teachers in the JSS and SSS. Only 5 percent of farmers indicated that their contacts with AEAs were occasional. While 68.3 perceived interactions as very frequent, 26.7 said they had frequent contacts with AEAs. This observation was expected because farmers form the main clientele for extension agents, and therefore the two ought to be in very regular and frequent consultation with each other.

The perception of JSS agricultural science teachers on how frequent their consultations with AEAs and farmers have been is shown in Table 14. Agricultural science teachers in the JSS perceived their interaction with both farmers and AEAs in their local communities as low. No JSS agricultural science teachers considered their interaction with either AEAs or farmers as frequent or very frequent. Occasional consultations were made with the local AEA by 72.4 percent of the JSS agricultural science teachers while 94.3 percent had made consultations with farmers. Those who had never made agricultural consultations with the local AEA constituted 27.6 percent, and 5.7 percent had never linked with farmers.

Table 14

JSS Agricultural Science Teachers Perceived Frequency of Consultation with Farmers and AEAs

Perceived Level Of consultation	Consultations with AEAs Frequency	%	Farmers Frequency	%
Very Frequent	0	0.0	0	0.0
Frequent	0	0.0	0	0.0
Occasional	63	72.4	82	94.3
None	24	27.6	5	5.7
	87	100.0	87	100.0

Source: Data from the study (2004)

The results shown in Table 14 demonstrate that when the need arises, a large percentage of agricultural science teachers in the JSS get in touch with AEAs and farmers to share experiences and solve problems in agriculture. Thus, agricultural science teachers in the JSS are more in contact with both farmers and AEAs than their counterparts in the SSS. They can also be regarded as occasional participants in agricultural extension delivery. These observations, therefore, put JSS agricultural science teachers in a more favourable position to participate effectively in SBESS as it is envisaged. Stern, Stone III, Hopkins, McMillion and Crain (1994) found in their study of school-based enterprises that several school authorities are inexperienced in networking outside the school system, although creating a network of community supporters has been discovered to be of

great importance to school-based enterprises. This could account for the lack of consultation between a large number of agricultural science teachers and AEAs, and also farmers.

The perceptions of SSS agricultural science teachers were sought on the frequency of their interactions with local AEAs in their school localities and the local farmers. The results shown in Table 15 indicate that very few agricultural science teachers in the SSS ever share their agricultural experiences with AEA or farmers in their communities. Almost 98 percent have never had consultations with farmers, with the remaining 2 percent making occasional contacts with some farmers. Only 6.5 percent have ever consulted with AEAs and the rest (93.5 %) making no contact ever with AEAs in the locality. This further reduces the possibility of SSS agricultural science teachers participating actively in SBESS. The involvement of SSS agricultural science teachers in agricultural extension activities has been identified in this study to be rather low and unreliable. This observation also points to a lower level of suitability of the Senior Secondary Schools as SBESS centres.

Table 15

SSS Agricultural Science Teachers Perceived Frequency of Consultation with Farmers and AEAs

	Consultation with			
	AEAs		Farmers	
Perceived Level	Frequency	%	Frequency	%
Very Frequent	0	0.0	0	0.0
Frequent	0	0.0	0	0.0
Occasional	3	6.5	1	2.2
None	43	93.5	45	97.8
	46	100.0	46	100.0

Source: Data from the study (2004)

4.11 Level of Motivation of Respondents to Get Involved in SBESS

Costley and Todd (1987) view motivation as an important factor in determining what a worker can do to improve his or her social status. Table 16 shows the percentage distribution of the various responses of respondent categories with respect to their interest in participating in SBESS. This was in answer to a single question asking them to rate their level of motivation to participate in SBESS. This question was limited to the relevant participants identified in the first phase of the study.

Table 16

Percent Distribution of Levels of Motivation of Relevant Participants in SBESS

Level of Motivation	Category of Essential Participant			
	AEAs	JASTs	SASTs	Farmers
Very High	46	84	36	82
High	50	16	16	13
Moderate	0	0	8	0
Low	4	0	0	5
Very Low	0	0	40	0
	100	100	100	100
N=	(93)	(87)	(46)	(120)

Source: Data from the study (2004)

The results in Table 16 show a generally high level of motivation among all categories of relevant participants identified for SBESS. JSS agricultural science teachers were found to show the highest level of motivation to participate in SBESS with 84 percent of them rating themselves as very highly motivated and all the remaining 16 also indicating high level of motivation. They were followed by farmers, among whom 82 percent were very highly motivated, 13 percent highly motivated and 5 percent with low motivation. The motivation level of AEAs was also quite high. Forty-six percent AEAs were very highly motivated while 50 percent were highly motivated. Only 4 percent of AEAs indicated low motivation to participate in SBESS. Senior Secondary School agricultural Science teachers who were perceived as unlikely active participants in SBESS indicated an

average level of motivation for participating in SBESS. They rated 36 percent very high motivation, 16 percent high motivation and 8 percent moderate motivation. Forty percent agricultural science teachers in the SSS perceived their level of motivation to participate in SBESS as very low. In addition to the low level of consideration of SSS agricultural science teachers are as relevant participants in SBESS by other participants, their own perceived level of motivation to participate in SBESS is rather low. This weakens the strength of the SSS as a suitable base for SBESS.

The observed results on motivation in the study find meaning in the definitions of motivation by Kreitner (1995) as "the psychological process that gives behaviour purpose and direction." Buford, Bedeian, & Lindner (1995) defined motivation as "a predisposition to behave in a purposive manner to achieve specific, unmet needs." It has also bee defined as "an internal drive to satisfy an unsatisfied need" by Higgins (1994); and "the will to achieve" by Bedeian, (1993). SSS agricultural Science teachers who do not find the need to disturb their academic activities with extra-curricular activities were not highly motivated enough to participate in SBESS. The high level of motivation recorded among the relevant participants is an indicator of the need for an extension support system that SBESS is to become. Bedeian, (1993) considers interest and desire as the engines of human motivation. Thus a teacher, who is interested in his students and his work, is motivated to work. The desire to achieve a set goal has also been found to urge the individual on to perform. Smith (1994) links the desire for attainment with interest as in the theory of functional autonomy. According to him, when an individual is interested in achieving a certain goal, he eventually

finds cause to defend all activities that lead to the achievement of that goal. It can bc inferred therefore that the high level of motivation among the relevant participants constituted a strength for SBESS.

4.12 Factors that Motivate Participation in SBESS

The purpose of this section was to describe the importance of certain factors in motivating AEAs, agricultural science teachers and farmers in the study. Specifically, the study sought to describe the ranked importance of the following ten motivating factors: (a) improvement of proficiency (b) sympathetic help with personal problems, (c) personal loyalty to occupation (d) interest in work, (e) better working conditions, (f)) expectation of improved income (g) promotions and growth in the organization, (h) feeling of being in on things, and (i) full appreciation importance of SBESS (j) survival in the occupation. The questionnaire asked participants to rank the importance of ten most important factors that motivated them in doing their work: 1=most important . . . 10=least important. The rating of the factors by each essential participant of SBESS has been shown in Table 17

Table 17

Rating of Perceived Motivating Factors for SBESS Participation

Motivating Factor	Mean Weighted Rating by					
	AEAs	JAST	SAST	FRM	Mean	SD
Improved income	3.1	1.3	5.2	1.4	**2.8**	**1.8**
Sympathetic to others' problems.	1.2	3.5	2.6	7.4	**3.7**	**2.7**
Work made easier	3.2	2.8	5.3	4.1	**3.9**	**1.1**
Personal interest in work	4.8	3.9	1.2	9.2	**4.8**	**3.3**
Appreciation of work done in SBESS	4.0	7.2	4.7	5.6	**5.4**	**1.4**
Survival in occupation	9.1	4.6	7.7	3.3	**6.2**	**2.7**
Promotions and growth	5.6	8.6	9.5	2.1	**6.5**	**3.3**
Good working conditions	7.6	5.4	3.6	9.3	**6.5**	**2.5**
Self-fulfilment	8.2	6.0	6.1	8.2	**7.1**	**1.2**
Personal loyalty to Stakeholders	6.3	9.7	8.5	6.4	**7.7**	**1.7**
N=	(93)	(87)	(46)	(120)		

Source: Data from the study (2004)

The ranked order of motivating factors by the various categories of respondents in the study has been shown in Table 17; the most important factor being at the top of the list with a lower ranking numeral. The overall ranking for the factors by all the respondents identified the following descending order of importance: (1) improved income, (2) sympathy for other peoples problems,

(3) work made easier through SBESS (4 personal interest in the work (5) appreciation for the work done in SBESS, (6) survival in the occupation of the individual, (7) promotion or growth in one's occupation. (8) good working conditions, (9) self fulfilment and (10) personal loyalty to other stakeholders.

The results show that motivation derived from anticipation of private gain can hold a greater store of value than other sources of motivation, as asserted by Quashigah (2002). A comparison of these results to Maslow's (1943) need-hierarchy theory provides some interesting insight into participant motivation. The number one ranked motivator, improved income, is a physiological factor. The number two ranked motivator, sympathy for other people's problems, is a self actualising factor, while the third ranked factor, work made easier is a physiological factor. Interest in work, which was the fourth ranked factor, is also a self actualising factor.

Therefore, in accordance with Maslow,s theory (1943), if managers of SBESS wish to address the most important motivational factor of the relevant participants, remuneration, social factors, provision of facilities and conditions to make work easy and interesting, must first be satisfied. If managers wished to address the most important motivational factor of SBESS participants, some negotiated allowances would suffice. Contrary to what Maslow's theory suggests, the range of motivational factors was mixed in this study. Maslow's conclusions that lower level motivational factors must be met before ascending to the next level were not confirmed by this study.

When the motivational factors identified in the study for by agricultural extension agents and agricultural science teachers are related to Herzberg's two-

factor theory, it is revealed that their motivation as participants of SBESS is influenced by mostly hygiene factors and few motivators. The highest (improved income) and second ranked motivator (sympathy for other people's problems) for example, are both hygiene factors. Herzberg, Mausner, & Snyderman (1959) stated that the absence of motivators does not lead to dissatisfaction. Further, they stated that to the degree that hygienes are absent from a job, dissatisfaction would occur. When present, hygienes prevent dissatisfaction, but do not lead to satisfaction. In our example, the lack of sympathy for others' problems (motivator) for the SBESS participants would not lead to dissatisfaction. Paying SBESS participants lower negotiated allowances (hygiene) than what they believe to be fair may lead to job dissatisfaction. Conversely, participants in SBESS will be motivated when they are doing interesting work but will not necessarily be motivated by higher allowance. Farmers would be paid by the benefits of improved technology adopted through SBESS. If, on the other hand, the learned technologies do not produce tangible outcomes in crop yields, ease of work, and increased incomes for the individual farmers, dissatisfaction will set in after a short time.

The other important dimension of the findings is how the rankings in this study compare with related research. A study of industrial employees, conducted by Kovach (1987), yielded the following ranked order of motivational factors: (a) interesting work, (b) full appreciation of work done, and (c) feeling of being in on things. Another study of employees, conducted by Harpaz (1990), yielded the following ranked order of motivational factors: (a) interesting work, (b) good negotiated allowances, and (c) job security.

In the two studies cited above, interesting work ranked as the most important motivational factor. Pay was not ranked as one of the most important motivational factors by Kovach (1987), but was ranked second in this research and by Harpaz (1990). Full appreciation of work done was not ranked as one of the most important motivational factors by Harpaz (1990), but was ranked second in this research and by Kovach (1987). The discrepancies in these research findings support the idea that what motivates employees differs given the context in which the employee works. What is obvious, however, is that employees rank interesting work as the most important motivational factor.

The ranked importance of motivational factors of respondents in the study provides useful information for the managers and relevant participants of SBESS. Knowing how to use this information in motivating SBESS participants is complex. The strategy for motivating SBESS participants depends on which motivation theories are used as a reference point. If Hertzberg's theory is followed, management should begin by focusing on pay and sympathy for other people's problems (hygiene factors) before focusing on interesting work and full appreciation of work done (motivator factors). If Adams' equity theory is followed, management should begin by focusing on areas where there may be perceived inequities (pay and full appreciation of work done) before focusing on interesting work and job security. If Vroom's theory is followed, management should begin by focusing on rewarding (with remuneration, easy work and interesting work) employee effort in achieving organizational goals and objectives.

Regardless of which theory is followed, interesting work and employee pay appear to be important links to higher motivation of SBESS participants.

Options such as job enlargement, job enrichment, promotions, internal and external stipends, monetary, and non-monetary compensation should be considered. Job enlargement can be used (by managers) to make work more interesting (for employees) by increasing the number and variety of activities performed. Job enrichment can used to make work more interesting and increase pay by adding higher-level responsibilities to a job and providing monetary compensation (raise or stipend) to employees for accepting this responsibility. These are just two examples of an infinite number of methods to increase motivation of employees at the centers. The key to motivating SBESS participants is to know what motivates them and designing a motivation program based on those needs.

The results also have implications for the entire cooperative extension system. The effectiveness of extension is dependent upon the motivation of its employees (Chesney, 1992; Buford, 1990; Smith, 1990). Knowing what motivates employees and incorporating this knowledge into the reward system will help extension identify, recruit, employ, train, and retain a productive workforce. Motivating Extension employees requires both managers and employees working together (Buford, 1993). Extension employees must be willing to let managers know what motivates them, and managers must be willing to design reward systems that motivate employees. Survey results, like those presented here, are useful in helping extension managers determine what motivates employees (Bowen & Radhakrishna, 1991). If properly designed reward systems are not implemented, however, employees will not be motivated.

The ranking of the factors show some variations as well as some similarities among the various respondent groups. For example,

"sympathy for other people's problems" which was chosen by AEAs as their most important motivator was the seventh for farmers. However, farmers chose improved income, which was the second for AEAs, as their most important motivating factor. Improved income, which was the overall most important ranked factor, was also ranked first by JSS agricultural science teachers and fifth by SSS agricultural science teachers. These differences are due, in part, to the fact that what motivates employees changes constantly (Bowen & Radhakrishna, 1991). For example, research suggests that as employees' income increases, money becomes less of a motivator (Kovach, 1987). Also, as employees get older, personal interest in the work becomes more of a motivator.

For an innovative system such as SBESS, it is important to recognize the factors that influence the motivation of key participants to participate in its activities in order to provide a sound basis for selection of sites, personnel, activities, time and materials. Motivation, according to Leonard (1977) is influenced by factors such as desirability of leaving a job, the ease of leaving, job satisfaction, role compatibility, personal characteristics, social status, and habituation to particular job or organisations.

The most important motivating factor for SSS agricultural science teachers to participate in SBESS was the personal interest participant has in the the work, followed in the second place by sympathy for other people's problems, and improved working conditions as the third major motivator Thus they would be reluctant to be in a job which is not interesting. Their appreciation of the importance of SBESS would form their fourth most important motivator.

Farmers appeared to concentrate their interest on the income from their farming operations and their occupational development as their major motivators. After choosing improved incomes as their most important motivating factor, they also identified growth in the farming occupation as their second, , survival in the work as an AEA, and work made easy their third and fourth most important motivators respectively.

4.13 Perceived Institutional Challenges to SBESS

The prospect of every system will also depend on the institutional environment within which it operates. A system of the nature of SBESS operates within two separate institutions, each of which is governed by different policies within the framework of the national constitution. The situation has the potential to present a number of challenges to the prospect of SBESS. The institutional challenges to SBESS perceived by respondents are tabulated in Table 18, with their mean weighted ratings.

JSS respondents comprised agricultural science teachers and JSS headmasters. SSS respondents were the SSS agricultural science teachers and the SSS heads. Ministry of Food and Agriculture (MOFA) Staff comprised the AEAs and DDOs

Table 18

Perceived Institutional Challenges to SBESS

TYPE OF CHALLENGE	Weighted ranking of problem importance by Staff of MOFA	JSS	SSS	TOTAL
Linking SBESS to both school curriculum and Farmers' needs	10	10	10	10
Inadequate institutional capacity to manage SBESS	10	10	10	10
Motivating AEAs and teachers	9	7	9	9
Getting farmers to visit the school farms regularly	8	9	6	8
Conflicting demands on the school farm enterprises	7	8	7	7
Networking/cooperation among SBESS actors and centers	6	4	8	6
Student motivation /participation.	5	6	4	5
Policy barriers	3	5	2	3
Partnership and assistance from NGOs and other organisations	4	2	3	3
Coping with staff turn-over	2	3	1	2
Gender mainstreaming	1	1	2	1

Source: Data from the study (2004)

Weighted mean rating = sum of ratings for a factor ÷ Number of responses.

The greatest challenges perceived to face SBESS was how to link the system to both the demands of school curriculum and the farmer, and the perceived inadequacy of institutional capacity to manage the system effectively. The second and third most important challenges respectively were motivating agricultural extension personnel and agricultural science teachers to be actively involved in the system, and getting farmers to visit school farms in order to learn technologies displayed and demonstrated there. These were followed by the conflicting demands of various school enterprises (4th), networking among the SBESS centers and stakeholders (5th), developing methods for encouraging and motivating students' independent participation in SBESS (6th). The others, in a descending order of importance, were coping with policy issues, creating partnership and assistance from NGOs and other agencies (7th) coping with staff turnover (8^{th}), and finally, gender mainstreaming (9^{th}).

The ranking of the challenges as presented by respondents is a guide for preparing towards the establishment of SBESS in the recommended schools. One of the top concerns was that there is the need to consider how the school curriculum can be blended with the needs and programmes in the local community to ensure that both adult and prospective young farmers in school derive essential benefits from each other's activities and experiences. Stern *et.al.* (1994) advised that commercial enterprises and community service must sometimes blend smoothly in school-based enterprises. This is what is actually required for SBESS to achieve. There seems, however, to be a total absence of a curriculum for enterprise programmes that could be used as a starting point for SBESS, or similar programmes from which students and the communities could benefit

educationally and technologically. As a result, there are missed opportunities for learning.

The other most prominent challenge was the perceived inadequate institutional capacity to manage the extension support system. This stems mostly from the weak financial base of the public extension and educational institutions that are envisioned to be involved in the extension support system. In examining why education in agriculture receives so little emphasis in several development plans, Lindley (1999) identified several institutional factors responsible for the situation. First, in most donor and technical assistance organisations, the position of "agricultural officer" who would be responsible for planning and facilitating agricultural education programmes does not exist. Hence, donor agencies approved projects for financial support and technical assistance without considering the formal education needs of recipient countries. There is also lack of cooperation, communication and collaboration between education and agriculture ministries and similar units in government, and NGOs. Lindley (1999) noted that the recognized responsibilities of separate ministries and departments of agriculture, education and research, and the difficulties they often have in collaborating complicate the work to be done in agricultural education.

The second and third rated challenges point to the need to devise appropriate means for ensuring that relevant participants in SBESS are motivated both intrinsically and extrinsically. Every enterprise, according to Stern *et al* (1994), strives to win and sustain the commitment of key players in its operations. This can be difficult, especially in the context of SBESS where students are involved, because younger people have shorter span. Those who particularly

require extrinsic motivation in terms of remuneration are AEAs and agricultural science teachers who may have to spend their personal time on school farms to facilitate SBESS activities. The outcome of SBESS must be immediately rewarding to both students and farmers who participate in it so that they will be intrinsically motivated.

The essence of collaboration and partnership among the various SBESS centers and individual participants, rated as the fourth challenge, is reflected by many communication experts including Rivera (2001), Venkatesan (1995), and Bebbington (1989). Also, the important roles played by sound planning at the policy level and collaboration with NGOs have been stressed by Cook (1996), especially in youth educational programme such as SBESS. New extension paradigms advocate partnership between government, farmers and the private sector development agencies. It is important for every SBESS center to benefit from the experiences of other centers so that they can all improve upon their performances. It is important to note that policy issues were not perceived to pose major threats to the prospect of SBESS. It suggests that agricultural and educational policies in the country are flexible enough to accommodate a system such as SBESS.

4.14 SWOC Analyses of Perceived Prospect Factors of SBESS

Each relevant participant group presented a different scenario with respect to their perception of the presence (Strength/opportunity) or absence of the factors perceived to influence the prospect of SBESS. A separate SWOC analysis

was, therefore, done for each respondent category. In real life situations, the absence or lack of strength does not necessarily indicate a weakness. However, several attributes interact with each other to produce an effect, which has the potential to achieve an expected outcome, or block the achievement of that outcome. Therefore, the multiplicity of identified strengths which contribute to the "detail complexity" of the prospect for SBESS is of no more significance than the interrelationships that exist among them, which constitute the "dynamic complexity" of the prospect.

4.15 Analysis of SBESS Prospect in JSS Perceived by JSS Heads

SWOC analyses of SBESS in the JSS were done from the responses of JSS headmasters/headmistresses, JSS agricultural science teachers and AEAs. Table 19 shows a SWOC analysis of SBESS in the JSS from the responses of JSS headmasters/headmistresses.

The major strengths and opportunities identified were high motivation of the agricultural science teachers in the JSS, a high level of cooperation between the agricultural science teachers and AEAs engaged in SBESS activities. Agricultural science teachers were perceived to possess high level of competency in teaching, have favourable attitudes toward SBESS and moderate educational levels. Participants were perceived to have a fair idea of their expected roles. The location of school farms, availability of sources of funding, the existence of farmer groups in the communities and school agricultural clubs in the various JSS were all perceived as fairly favourable and provided some opportunities and

strengths for SBESS. Also, they noted that there was enough time for agricultural science teachers to be able to participate in SBESS activities

Table 19.

SWOC Analysis of SBESS Prospect in JSS by JSS Heads

Strengths/ Opportunities	Factor Strength	Weaknesses/ Constraints	Factor Strength
Motivation of ASTs	3.98	Suitability of school farm	2.82
Cooperation between AEA & AST	3.58	Adequacy of supervision	2.60
Competency of AST	3.48	Adequate agric equipment	2.37
Attitude of AST	3.45	Farmers' level of education	1.70
Education level of AST	3.35		
Knowledge of roles	3.15		
Distance of school farm	3.12		
Time available for AST	3.12		
Adequate funding	3.10		
Existence of FBO	3.03		
Active school Agric Club	3.00		
$\Sigma (R - 3) = 3.36 - 2.51 = 0.85$			
$\mathbf{P = 0.85 \div 15 = 0.0567}$			

Source: Data from the study (2004)

Where P = Prospect Strength

R = Rating of strength or weakness

N = Number of items (strengths and weaknesses) rated

The major constraints perceived in the SWOT analysis include the low level of literacy among farmers, inadequacy of agricultural equipment for school farming, poor supervision, and school farms not being adequately suitable for SBESS. The Force Field Analysis of the headmasters/headmistresses' responses showed a positive level of prospect for SBESS in the JSS with a prospect level of .0.0567. The results show that in the view of JSS headmasters, there is a positive prospect for SBESS in the JSS. The graphical presentation shown in Figure 5 clearly shows a greater area under the positive curve than the negative curve, indicating that the driving forces for SBESS outweighed the restraining forces. Thus, the results show that in the view of JSS headmasters, there is a positive prospect for SBESS in the JSS.

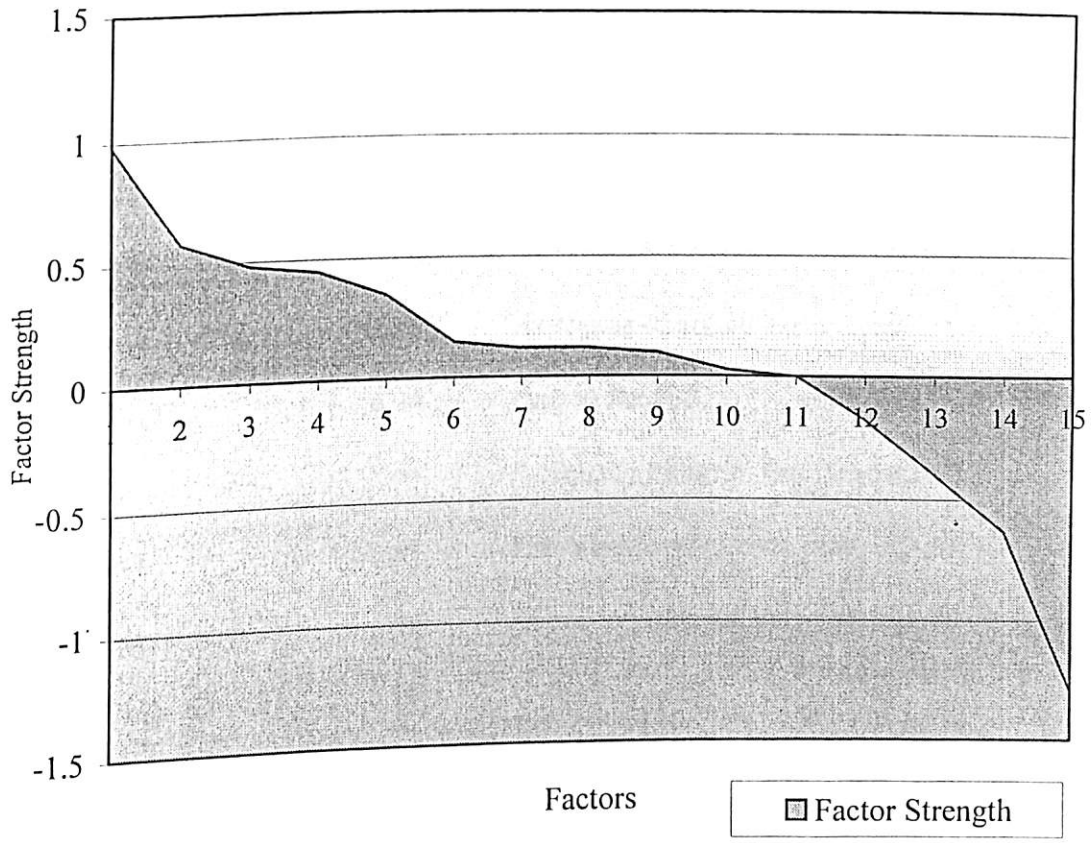


Figure 5. Force Field Analysis for SBESS Prospects in JSS as Perceived by JSS Heads

4.16 Analysis of SBESS Prospect in JSS Perceived by JSS Agricultural Science Teachers

The SWOC analysis of SBESS in the JSS from the responses of agricultural science teachers in the JSS is shown in Table 20. The strengths and opportunities (driving forces) for SBESS in the JSS were perceived by the agricultural science teachers to be greater in number than weaknesses and constraints (the restraining forces)

Table 20.

SWOC Analysis of SBESS Prospect in JSS by JSS Agricultural Science Teachers

STRENGTHS/ OPPORTUNITIES	FACTOR STRENGTH	WEAKNESSES/ CONSTRAINTS	FACTOR STRENGTH
Competency of AST	4.28	Existence of active agric	
Motivated ASTs	4.24	club in the JSS	2.74
Cooperation between		Adequacy of agric. Equipment	2.62
AEA & AST	3.99	Knowledge of roles to play	2.57
Education level of AST	3.98	Education level of farmers	1.79
Time available for AST	3.86		
Adequacy of supervision	3.25		
Distance to school farm	3.23		
Suitable school farm	3.22		
Adequate funding	3.06		

$\Sigma (R - 3) = 6.11 - 2.28 = 3.83$

$P = 3.83 \div 14 = 0.2736$

Source: Data from the study (2004)

The results show the strengths and opportunities identified by the JSS agricultural science teachers in order of decreasing importance as: the high level of competency among agricultural science teachers in the JSS, the agricultural science teachers' high level of motivation, the high level of cooperation existing between agricultural science teachers and AEAs, highly educated agricultural science

teachers and adequate time available at the disposal of agricultural science teachers for SBESS activities. Also, there exists adequate supervision at the JSS to ensure smooth operation of SBESS, distance from the schools to school farms are adequately short, school farms are available and suitable for teaching and learning, adequate funding are expected to flow. The great number of strengths and opportunities perceived by JSS agricultural science teachers depicts the positive attitudes they were found to possess toward SBESS.

Weaknesses and constraints perceived by the JSS agricultural science teachers were, in order of decreasing importance, farmers low level of education, lack of role clarity among relevant participants of SBESS, inadequate agricultural equipment for teaching modern agriculture, and non-existence of active Agric Club in the JSS. The driving and restraining forces identified for SBESS in the JSS by the JSS heads and the agricultural science teachers were strikingly identical, although there were some differences in the order and magnitude of importance assigned to them. Low level of education among farmers and inadequate supply of agricultural equipment for teaching were seen as major constraints for SBESS in the JSS by both the head teachers and agricultural science teachers. However, while the agricultural science teachers were not clear about their roles in SBESS, the head teachers, whose roles in the school system are mostly supervisory, were of the opinion that roles are clear enough, even before SBESS is implemented.

The estimation of the prospect for SBESS using Force Field analysis, as illustrated graphically in Figure 6, shows a positive prospect value (0.2736). The area under the positive curve in Figure 6 is clearly greater than the area under the negative curve. As observed in the SWOC analysis, the restraining forces

were much fewer and weaker than the driving forces perceived by the JSS agricultural science teachers. It was, however, evident that the low education of farmers was perceived as a very strong constraint, relative to the other constraints, with a factor strength of -1.21.

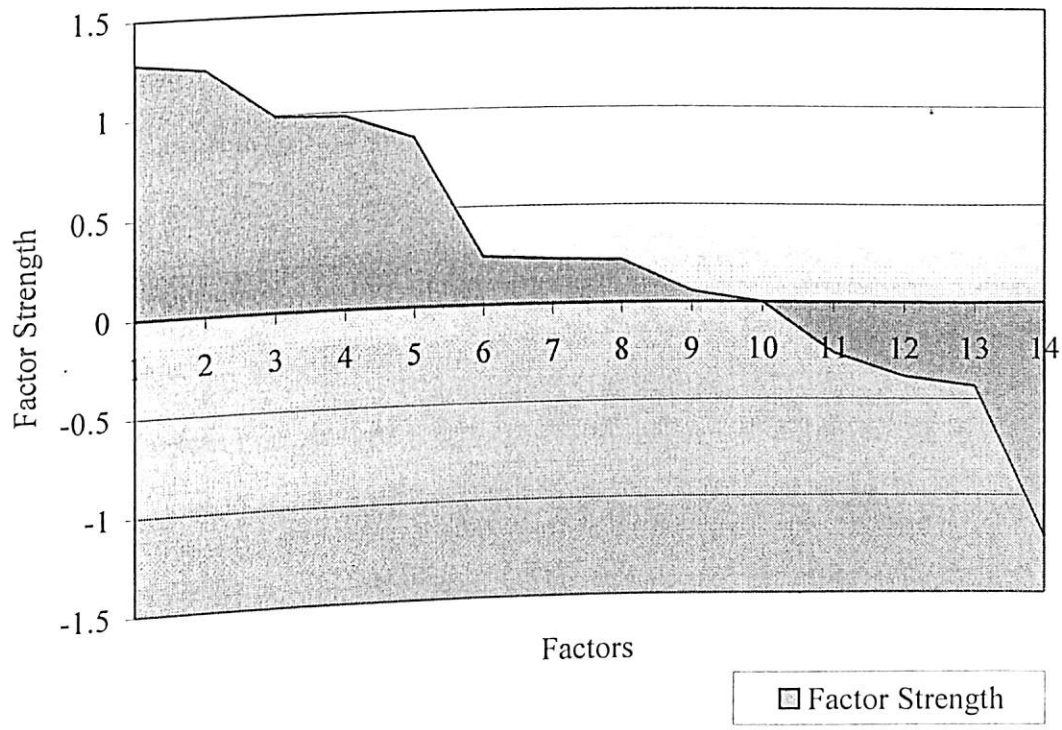


Figure 6. Force Field Analysis Chart for SBESS Prospects in JSS as perceived by JSS Agricultural Science Teachers

4.17 Analysis of SBESS Prospect in JSS Perceived by AEAs

Although agricultural extension agents were not members of the school system, they provided a useful external view of the prospect of SBESS in both the JSS and SSS through SWOC and Force Field Analyses of factors perceived by them.

Table 21

SWOC Analysis of SBESS Prospect in JSS by AEAs

Strengths/ Opportunities	Factor Strength	Weaknesses/ Constraints	Factor Strength
Motivated AEAs	3.80	Adequate funding	2.57
AEA & AST Cooperation	3.80	Education level of farmer	2.03
Attitude of JSS ASTs	3.50	Adequate agric equipment	2.01
Role of Agric Policy	3.48		
Farmers' attitude	3.45		
Knowledge of roles	3.45		
Suitability of school farm	3.41		
Competence of AEAs	3.34		
Education level of AEA	3.33		
Existence of farmer group	3.22		
Adequacy of supervision	3.12		
$\Sigma (R - 3) = 5.04 - 2.39 = 2.65$		**P = 2.65 ÷14 = 0.1893**	

The SWOC analysis of prospect in the JSS through the responses of AEAs has been shown in Table 21 above. Opportunities and strengths that were rated as strong driving forces were high motivation among AEAs, high level of cooperation between AEA & Agricultural science teachers, and favourable attitude of JSS Agricultural science teachers towards SBESS. Other opportunities and strengths identified by the AEAs were the presence of an agricultural extension

policy that encourages the conduct of extension activities in schools, a fairly favourable attitude of farmers towards school-based extension activities in the JSS, a fair level of knowledge of the roles relevant participants have to play in school extension activities, and the availability of suitable school farms in the JSS. Also, the AEAs considered themselves as fairly competent enough to engage in the prescribed SBESS activities, although they were not fully satisfied with their own level of education. They also considered the number of farmer groups in their operational areas as fairly adequate, indicating that there was still the need to increase the number of farmer groups to work with in the communities. They were not satisfied with the level of supervision in the MOFA. AEAs are supposed to be under the direct supervision of the DDOs, who should monitor all their activities and offer assistance where needed. The strongest constraint identified by the AEAs against SBESS was inadequacy of agricultural equipment in the JSS. This was followed by the low level of education among farmers, and expected low level of funding.

The Force Field Analysis produced a prospect strength of 0.1893, showing a positive prospect. Figure 7 shows a large area under the positive curve, in contrast with the smaller area showing under the negative curve. The prospect strength was weak, because, although more driving forces were identified by the AEAs for SBESS, the factor strengths were weaker than the few restraining forces identified.

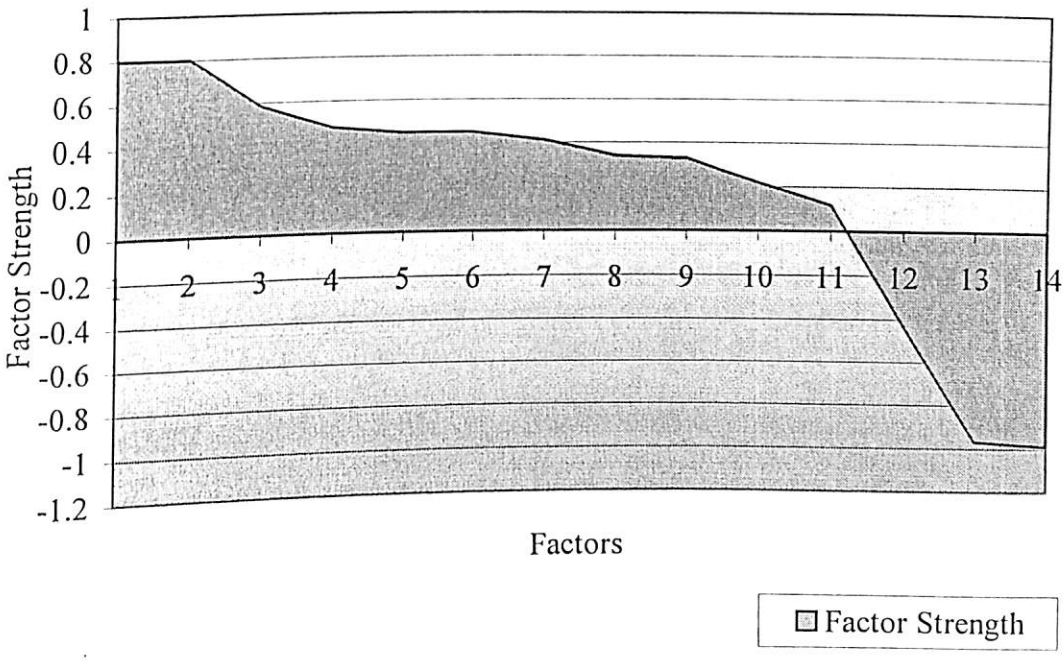


Figure 7. Force Field Analysis Chart for SBESS Prespects in JSS as Perceived by AEAs

4.18 Analysis of SBESS Prospect in SSS Perceived by SSS Heads

The SWOC analysis of prospect for SBESS in the SSS was done from the responses of the SSS heads, SSS agricultural science teachers and local AEAs. The SWOC analysis from the SSS heads is shown on Table 22, which shows a greater number of identified weaknesses and constraints than strengths and opportunities.

Table 22

SWOC Analysis of SBESS Prospect in SSS by SSS Heads

Strengths/ Opportunities	Factor Strength	Weaknesses/ Constraints	Factor Strength
Time available for AST	4.00	Education level of AST	2.95
Attitude of AST	3.95	Knowledge of roles	2.71
Motivation of ASTs	3.81	Availability of agric equipment	2.57
Cooperation between		Distance of farm from school	2.57
AEA & AST	3.71	Adequacy of supervision	2.43
Competency of AST	3.43	Adequate funding	2.33
Suitability school farm	3.05	Existence of active Agric Club	
		in school	2.24
		Educational Level of Farmers	1.90

$\Sigma (R - 3) = 3.95 - 4.30 = -0.35$

$\mathbf{P = -0.35 \div 14 = -0.0250}$

Source: Data from the study (2004)

The constraints and weaknesses identified for SBESS in the SSS outnumbered the strengths and opportunities. The strengths and opportunities were adequate time available for agricultural science teachers to engage in SBESS activities, favourable attitude and high level of motivation of agricultural science teachers toward SBESS, high level of cooperation between the local AEAs and agricultural science teachers, satisfactory competency of the AEAs, and availability of suitable school farms in the SSS. It was evident from the results

that school farms were more available and better organized for teaching and learning purposes than in the JSS where over 38 percent did not have farms at all.

Constraints identified by the SSS heads in descending order of importance were the low level of education among farmers, the absence of students' agricultural clubs in the SSS to facilitate SBESS activities, inadequate expected funding and inadequate supervision, school farms being usually too distant from school compounds and hence the communities, unavailability of agricultural equipment in the schools for teaching agriculture, lack of role clarity among the relevant participants of SBESS, and low level of education among agricultural science teachers. The rating of the severity of the constraints and weaknesses were high.

The estimation of the prospect for SBESS in the SSS by Force field Analysis according to the driving forces (strengths and opportunities) and restraining forces (weaknesses and constraints) identified by the SSS heads, indicated a negative prospect value (-0.0250). This is illustrated by the graph in Figure 8, in which the area under the negative curve is greater than the area under the positive curve. It shows how the restraining forces were greater in both number and strength than the driving forces perceived by the SSS heads.

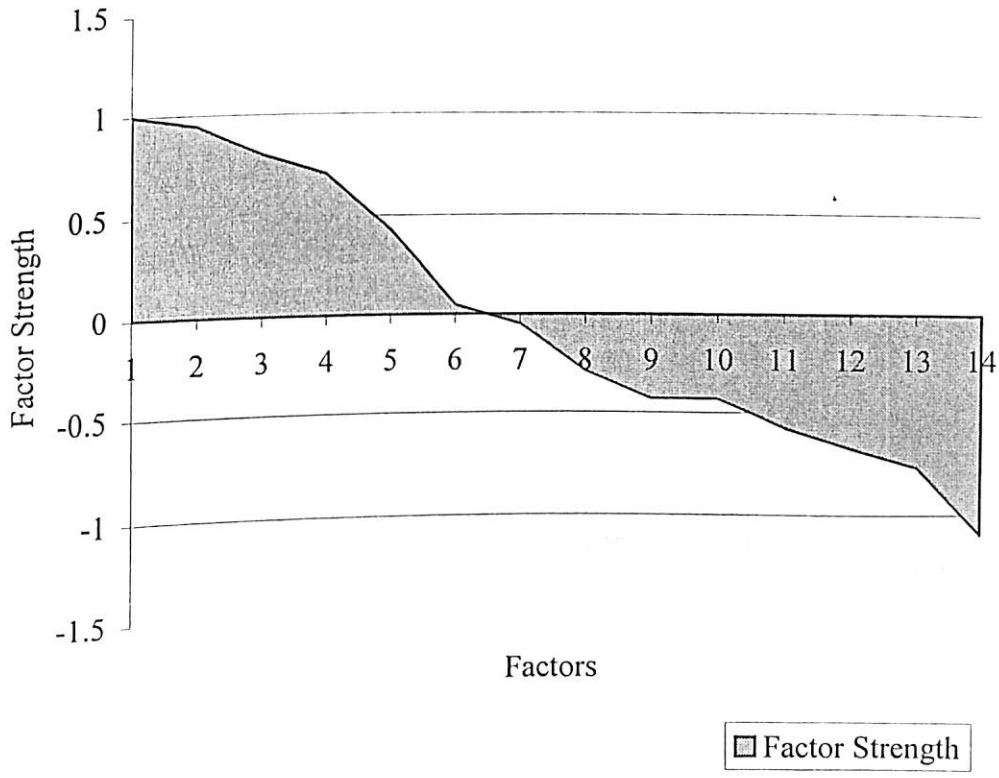


Figure 8. Force Field Analysis for SBESS Prospects in SSS as perceived by SSS Heads

4.19 Analysis of SESS Prospect in SSS Perceived by SSS Agricultural Science Teachers

Table 23 shows a SWOC analysis of the prospect for SBESS in the SSS by agricultural science teachers in the SSS. The strengths and opportunities that serve as driving forces perceived by the teachers were more than weaknesses and constraints perceived. This was a contradiction to the perception of the SSS heads from the same schools.

Table 23

SWOC Analysis of SBESS Prospect in SSS by SSS Agricultural Science Teachers

STRENGTHS/ OPPORTUNITIES	FACTOR STRENGTH	WEAKNESSES/ CONSTRAINTS	FACTOR STRENGTH
Motivated ASTs	3.70	Knowledge of roles	2.98
Education level of AST	3.67	Adequacy of equipment	2.86
Time available for AST	3.56	Adequacy of supervision	2.76
Cooperation between AEA & AST	3.54	Education level of farmers	2.63
Suitable school farm	3.48		
Competency of AST	3.48		
Attitude of AST	3.15		
Adequate funding	3.09		
Existence of active Agric club in school	3.04		
Distance of farm from school premises	3.04		
Presence of Farmer group	3.02		

$\Sigma (R - 3) = 4.09 - 0.77 = 3.32$

$\mathbf{P = 3.32 \div 15 = 0.2213}$

Source: Data from the study (2004)

While the SSS agricultural science teachers were of the view that their level of formal education was adequate enough for them to engage in SBESS,

the SSS headmasters were of the opinion that the teachers level of education was low. Also, the agricultural science teachers considered the level of funding, the existence of active agricultural clubs in the schools, and the distance between school farms and the schools as driving forces, contrary to the consideration of those factors as restraining forces by the SSS heads. The direct involvement of the agricultural science teachers in school agricultural activities has equipped them with experiential knowledge about the restraining and driving forces in agricultural education activities in the school, which could be quite different from the perceptions of the headmasters who do not directly and actively participate in agricultural education. It is very possible that some headmasters do not supervise agricultural education activities in their schools at all. The perceptions of passive participants in a programme would be quite different from the active participants.

Opportunities and strengths for SBESS identified by SSS agricultural science teachers were similar to those perceived by the JSS agricultural science teachers for SBESS in the JSS. However, the ratings for the SSS were much lower than the JSS. Most prominent among the strengths identified were: high levels of motivation and education of SSS agricultural science teachers, time available for the SSS agricultural science teachers to engage in SBESS activities, good cooperation between AEAs and SSS agricultural science teachers, presence of suitable school farms in the SSS, satisfactory competence and attitudes for SBESS on behalf of the agricultural science teachers. Others were the expectation of adequate funding for SBESS activities, the existence of active Agric club in the SSS, good proximity of school farm from the school compound, and the presence of Farmer Groups in the local communities.

Weaknesses and constraints that served as restraining forces for SBESS were listed in order of decreasing importance as farmers' low level of education, inadequate level and quality of supervision in the SSS, inadequate supply of agricultural equipment for teaching and learning purposes, and poor knowledge of roles to be played in SBESS by prospective relevant participants.

A graphical presentation of the Force field Analysis to determine the prospect for SBESS is shown in Figure 9. It is evident from the graph that the area under the positive curve is greater than the area under the negative curve, indicating that there is a positive prospect for BESS in the SSS, according to the perception of SSS agricultural science teachers. The prospect strength computed from the Force field Analysis was 0.2213. Thus, the prospect strength of SBESS in the SSS as perceived by the Heads and agricultural science teachers were lower than the prospect in the JSS.

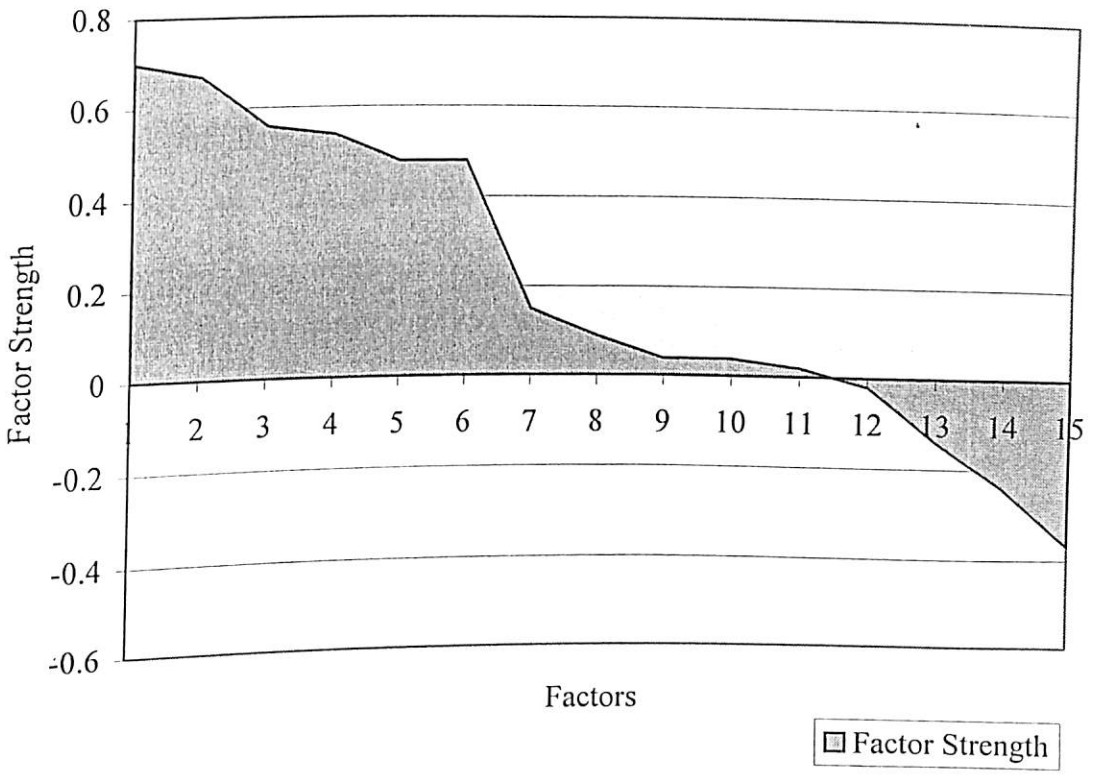


Figure 9. Force Field Analysis Chart for SBESS prospects in SSS as Perceived by SSS Agricultural Science Teachers

4.20 Analysis of SBESS Prospect in SSS Perceived By AEAs

The SWOC analysis of the prospect for SBESS from the perceptions of AEAs has been presented in Table 24. The factors are presented in descending order of importance, as rated by the responding AEAs. In the case of SSS, AEAs' motivation for SBESS was perceived as high. The AEAs perceived fair levels of opportunity, the existence of agricultural extension policy that encourages the conduct of extension activities in schools, favourable attitude of farmers towards school-based extension activities in the SSS, a fair level of knowledge of the roles relevant participants have to play in school extension activities, and the

availability of suitable school farms in the SSS. Other opportunities and strengths identified by the AEAs were that the AEAs considered themselves as fairly competent enough to engage in the prescribed SBESS activities, their education level as fairly adequate. Also, there was a satisfactory number of farmer groups to work with from the communities.

Table 24

SWOC Analysis of SBESS Prospect in SSS by AEAs

Strengths/ Opportunities	Factor Strength	Weaknesses/ Constraints	Factor Strength
Motivated AEAs	3.80	Adequacy of funding	2.57
Role of official policy	3.48	Farmers' education level	2.03
Farmers' attitude	3.45	Adequacy of equipment	2.01
Knowledge of roles	3.45		
Suitability of school farm	3.41		
Competence of AEAs	3.34		
Education level of AEA	3.33		
Existence of farmer Groups	3.22		
Attitude of JSS ASTs	3.21		
Cooperation between AEA & AST	3.21		
Adequacy of supervision	3.12		
$\Sigma (R - 3) = 4.02 - 2.39 = 1.63$		**P = 1.63 ÷ 14 = 0.1164**	

Source: Data from the study (2004)

There was a fairly favourable attitude of SSS Agricultural science teachers towards SBESS but a fairly low level of cooperation between SSS agricultural science teachers and AEAs. They considered supervision from their section as fairly adequate.

The constraints identified in the SSS were the same as those in the JSS in the same order: inadequate agricultural equipment, low level of farmers' education and inadequate funding expected. The factor strengths rated by the AEAs for both JSS and SSS were equal.

The Force field Analysis of the driving and restraining forces yielded a prospect strength of 0.1164, indicating a positive but weak prospect in the SSS. Like the JSS, although more driving forces were identified, their individual factor strengths were not as high as the individual factor strengths of the restraining forces. As depicted in Figure 10, the area under the positive curve shows the total driving force is greater than that under the negative curve. Hence the prospect for SBESS in the SSS was also perceived by the AEAs as positive but weaker than in the JSS.

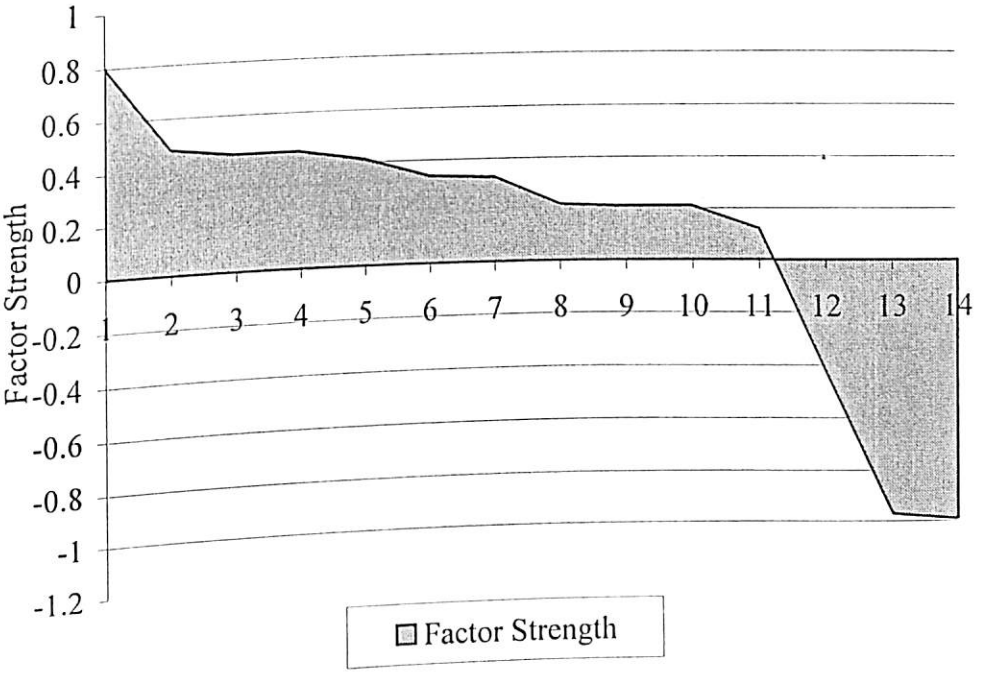


Figure 10. Force Field Analysis Chart for SBESS Prospects in SSS as Perceived by AEAs

An overview of the results shows that all the categories of respondents rated the prospect for SBESS in the JSS as higher than the SSS. Incidentally, SSS headmasters/headmistresses rated the prospect for SBESS in the SSS as negative, indicating that it had no place there. This is reflected in almost all the factors identified to influence the use of the schools as centers of extension support activities. Table 25 shows a comparison of the prospect strengths computed through force field analysis of the various respondent categories.

Table 25

Comparison of Prospect Strengths between JSS and SSS by Respondent Groups

RESPONDENT CATEGORY	PROSPECT STRENGTH FOR	
	JSS	SSS
JSS Heads	0.0567	--
SSS Heads	--	- 0.0250
JSS ASTs	0.2736	--
SSS ASTs	--	0.2213
AEAs	0.1893	0.1164
MEAN	0.1732	0.1042

Source: Data from the study (2004)

The overall prospect strength for the JSS was greater than the strength for the SSS, meaning the JSS is perceived to be a more suitable location for operating an extension support system to assist both students and farmers in getting greater contacts and benefits from agricultural extension agents in their communities. The overall mean prospect value for the JSS was 0.1732, and that for the SSS was 0.1042, an indication that most of the driving forces would have to be improved in strength in order to create better opportunities and less and weaker restraining forces for SBESS.

Striking similarities were observed in the trends of ranking the respondents' perceived level of prospect for SBESS, and the prospect as determined by the Force Field Analysis, as can be found in Tables 8 and 26.respectively. For the

JSS, the highest perceived ranking came from DDOs, (3.96) followed by JSS agricultural science teachers (3.84), JSS Heads (3.80), and finally AEAs (3.76). In the computed prospect through FFA, the order was JSS agricultural science teachers (0.2736), AEAs (0.1893), and finally JSS Heads (0.0567). For the SSS, the highest perceived prospect was rated by DDOs and Agricultural science teachers (both averaging at 3.70). They were followed by AEAs (3.58) and SSS Heads (3.50). The FFA computed prospect followed the same order; Agricultural science teachers (0.2213), AEAs (0.1164) and SSS heads (- 0.0250). A comparison of the perceived and the FFA derived prospect strengths of the system indicates that the latter was lower. the agricultural science teachers

The most important constraints identified generally among all the respondent categories were:

1. low level of education among farmers; and
2. low supply of agricultural equipment in the schools

Most categories of respondents also identified (a) expected adequacy of funding for the system, (b) poor role clarity among the relevant participants, and (c) the unsuitable nature of school farms as constraints, especially in the JSS. It was noted in the study that several JSS did not have school farms at all, an indication that practical agricultural activities are scarcely demonstrated to students on the farm. This situation has contributed massively to the theoretical nature of school agriculture and the lack of emphasis on practice, which has persisted for so long in the formal educational system in Ghana.

The importance of clientele groups in agricultural extension has been identified by several extension workers and experts. As an illustration of the

value of farmer groups in cost effective extension delivery in several countries in Africa, Sasakawa Global 2000 (SG2000) aimed at ensuring food security, and emphasized group formation and cooperation among beneficiary farmers. Most of the respondents in the study considered the number of farmer groups in the region as low. However, according to Newby (1987), the rural community exists as an occupational community, in which relationships established at work spill over to leisure hours. Farmers in the village community are held together as a natural group by the strong kinship links among them and the need for cooperation in times of family crisis (Francis & Henderson, 1992). Thus the effect of the absence of other forms of farmer groups would be mitigated by the natural and phenomenal ties among farmers

4.21 Perceived Roles for Relevant Participants of SBESS

Roles expected to be played by the relevant actors in SBESS were identified from the opinions of the respondents in the study. The determination of the perceived roles was to provide the necessary input for developing the framework for SBESS. The perceived roles of the various relevant participants were ranked according to the number pf participants that chose that role for the participant group. The ranked perceived roles for the participant groups have been shown in Tables 26 to 31.

4.21.1 Perceived Farmer Roles

Table 26 shows the frequency distribution of respondents on the perceived farmer roles. Summary of rankings shows that the most expected role to be played by farmers in SBESS was the regular attendance to SBESS meetings and programmes, as cited by 93 respondents. This was followed in order of decreasing importance by the provision of information for needs analysis to both the agricultural science teachers and AEAs (41 respondents), provision of labour for demonstrations (40 respondents), the formation of farmer groups (36 respondents), and providing feedback information for evaluating SBESS (26 respondents).

Attendance at meetings is one of the most effective ways of indicating the interest of participants in a programme. The result shows that SBESS will not be effective without the regular presence of farmers at the organized meetings and programmes. The observation confirms what Deshler and Sock (1985) identified as the concepts of participation, cooperation, and empowerment which they considered as very important in development. Also, Lee (1972) found people's participation to be very important for the success of any programme.

Table 26

Ranked perceived roles of farmers in SBESS

Expected Role of farmers	Frequencies					
	Total	AEAs	JAST	SAST	JSH	SSH
Attend SBESS meetings	93	26	30	14	19	4
Provide information on Farmers' needs	71	17	20	17	14	3
Provide labour for SBESS activities	41	20	9	3	5	4
Participate in group activities	40	16	11	3	6	4
Form extension groups	36	8	14	3	9	2
Give feedback information to ASTs and AEAs	26	6	3	6	7	4

Source: Data from the study (2004)

The release of information by farmers in their needs assessment, which was ranked the second most important role of the farmer in SBESS, has been recognized by Lee (1972) as an essential activity for the success of any extension programme. She noted that local participation might mean involvement in planning, including assessment of needs. In her opinion, even if local people do not take part in the planning, they should be, at least, informed of the plans designed for their area if they are expected to consent and cooperate in the programme implementation. According to Deshler and Sock (1985), the underlying assumption of participation in the context of cooperation is that beneficiaries of any

development programme are required to cooperate with planners, administrators and power elite.

Providing labour in SBESS activities can be considered as a kind of participation, especially where hands-on participation in some manual activities is required. Incidentally, this role was ranked almost the same as farmers' expected role of participating in group activities. Both roles are directly related to participation as noted by Lee (1972). Farmers were also expected to form farmer groups for SBESS. This is in recognition of the importance of farmer groups in the implementation of extension programmes. Knipscheer, Zinnah and Mutimba (2002) have expressed that farmer organizations that are able, motivated and sufficiently independent to effectively represent farmers' interests are indispensable in protecting and enhancing the small-holder agricultural system. Farmers were also expected to provide feedback information for monitoring and evaluating SBESS. This role is similar to the offering of information for needs assessment, which was rated as the second most expected farmer role.

4.21.2 Perceived Agricultural Science Teachers' Roles

Teachers' roles in SBESS have been ranked in Table 27 in descending order of perceived importance. As the most important perceived role, 69 respondents were of the opinion that agricultural science teachers should stay in regular linkage with AEAs for information on innovative technologies.

Table 27

Ranked perceived roles of agricultural science teachers in SBESS

Expected Roles of ASTs	Frequencies					
	Total	AEAs	JAST	SAST	JSH	SSH
Plan SBESS activities with AEA	69	19	29	7	4	10
Organize students field Activities	62	17	14	13	4	14
Guide visiting farmers	45	17	15	4	4	5
Offer technical advice to Farmers	42	9	12	7	4	10
Direct farmers to AEA	38	17	8	4	2	7
Keep SBESS Activities records	25	9	3	4	2	7
Link AEA to School Authority	22	5	3	7	1	6

Source: Data from the study (2004)

Agricultural science teachers were expected by 62 respondents to plan and organize students for practical work on SBESS fields based on innovations prescribed by the AEA. Thirdly, they were expected to guide visiting farmers to SBESS demonstration sites in the school (45 respondents), and also, to offer technical advice to farmers who consult them for assistance (42 respondents),

The agricultural science teachers were also perceived to have other roles to play in SBESS which include directing farmers to the local AEA for technical advice (38 respondents), keeping of records on SBESS activities and other records (25 respondents), and linking the local AEA with the school administration (22 respondents).

4.21.3 Perceived AEA Roles

SBESS is expected to be owned basically, by farmers, the AEA, the school and students. The local AEA would be responsible for as many centers as there would be in the operational area concerned. These centers would provide the AEA with the means to harness the knowledge and cooperation of agricultural science teachers, as well as agricultural learning facilities in the various schools to communicate innovative skills to both students and farmers in the communities in the operational area. In the system, the roles perceived by respondents to fall in the responsibility of the AEA have been shown in a ranked order in Table 28.

The most expected AEA role in SBESS was the provision of technical information on new technologies to the agricultural science teachers in the SBESS centers as perceived by 67 respondents. This role would form the basis upon which continuous flow of technological skills and information could be established between the school and the agricultural sector. When agricultural science teachers are equipped with adequate relevant agricultural skills and information, then their students would be guided to demonstrate on the technologies on their learning plots for farmers to observe for adoption. To facilitate this, there must exist as part of the system, a definite time and means by which the AEA and agricultural science teachers can regularly meet to facilitate this linkage. This could be regarded as the greatest perceived agricultural need for the schools, which the AEA would be able to meet.

Table 28

Ranked perceived roles of AEAs in SBESS

Expected Roles of AEAs	frequencies					
	Total	AEAs	JAST	SAST	JSH	SSH
Furnish ASTs with technical information	67	20	23	9	12	3
Offer technical advice to farmers	61	17	20	9	12	3
Plan and organize field demonstrations with AST	54	11	12	12	16	3
Direct farmers to visit SBESS schools	42	14	11	7	9	1
Offer technical advice to AST & students	32	9	7	5	7	4
Link school to MOFA Officials	25	10	6	4	4	1

Source: Data from the study (2004)

Sixty-one (61) respondents also expected the AEA to offer technical advice to farmers in the community. This has hitherto been the regular activity of the AEA. However, if SBESS is accepted and operated in a community, farmers are going to demand greater extension services because the support system is going to generate greater awareness and interest among farmers. Then, the work load on

the AEA is going to increase. Generally, several people would not want to be saddled with a heavy workload and this would discourage AEAs from engaging in SBESS. However, this tendency is expected to be mitigated by the shared responsibilities between the agricultural science teachers and the AEAs.

Other roles expected of AEAs include planning and executing field demonstrations with the agricultural science teacher. This means that the AEA must be equipped with the competencies needed for teaching in schools (54 respondents). As found by Ayewoh (1983) and Ongondo (1984), these include professional competencies in the areas of administration, programme planning and execution, evaluation, communications, teaching and extension methods, and understanding human behaviour.

AEAs were also expected by 42 respondents to direct clientele farmers to the SBESS sites to observe demonstrated technologies. The role of giving technical assistance to the agricultural science teachers and students in the school (as expected of AEAs by 32 respondents) would be a complementary affair, because the AEA would also be learning a lot of technologies from the school and the agricultural science teacher. Finally, the AEA would be expected to serve as a link between the school and the Ministry of Food and Agriculture (25 respondents). Thus, this would be a means of bridging the gap between the two major ministries in the country that provide agricultural education to citizens.

4.21.4 Expected Roles of School Heads

School heads are the chief executives on the school premises, and must have authority over all curricular as well as non-curricular issues in the school. Officially, they must also supervise all the teachers and their activities in the school. The roles for the heads of schools, as perceived by the respondents in the study, were in agreement with these stipulated responsibilities. These roles have been ranked in descending order of perceived importance in Table 29.

Table 29

Ranked perceived roles of school heads in SBESS

Expected Roles	frequencies					
Of School Heads	Total	AEAs	JAST	SAST	JSH	SSH
Source for funds for SBESS	73	19	16	14	17	7
Provide policy guidelines	67	22	22	10	11	2
Provide school facilities	62	23	15	7	11	6
Supervise activities	56	18	13	9	14	2
Liaise with collaborators	29	8	11	3	2	4

Source: Data from the study (2004)

A total of 73 respondents were of the opinion that the school head should source for funds for SBESS. This role was ascribed to no other participant apart from the school head and was perceived as the most important role because channeling funding through a single channel has been found to be more sustainable than passing funds through several hands. Experience from Benin, as

reported by Cassaday, Monnet & Dowswell (1995) has shown that funding for agricultural extension programmes is more effective if all sources are channeled through one agency. Funding has been found to be a crucial factor in the organisation and implementation of every agricultural programme. Hence, identifying the source of funding is an essential role that should be under the direct control of the head of institution. Sixty-seven respondents perceived the school heads to be responsible for providing policy guidelines for the operation of SBESS in their schools. These policy guidelines would create the enabling environment in the school for SBESS to thrive. Bawden, Macadam, Packham, and Valentine (1984) noted that the organizational structure of educational institutions needs to be open and flexible to accommodate rapid and unpredicted changes in the needs of learners as well as the supra system of government funding policies.

Provision of equipment in the school for practical agricultural lessons was perceived as the school head's role by 62 respondents. This would require both public and private funding. In Ghanaian schools, some agricultural facilities are provided by government while, the students, parents, traditional authorities, individuals and the schools themselves provide facilities for practical agriculture.

Supervision of SBESS activities was perceived as a role for school heads by 56 respondents. This is an unexpectedly low rating, since the school head's most important official responsibility is to supervise all activities in their school. It implies that some respondents did not perceive supervision as important in their mental picture of SBESS. However, Buford, Bedeian, & Lindner (1995) have noted that supervision is vital for the success and impact of any agricultural extension system. Also, they disclosed that supervision is one of the major

determinants of motivation to work, because it is closely associated with job satisfaction. An effectively supervised worker is e very likely to work hard enough to achieve the desired goal and gain satisfaction out of that. This generates intrinsic motivation to be committed to the work being done. It is, therefore, essential to factor into SBESS an efficient supervisory system that will ensure its sustainability and performance.

Liaising with collaborators in SBESS was considered as a school head's role by 29 respondents. There is a strong feeling among analysts such as Carter (1991), Obasanjo (1991) and Berg (1991) that extension activities should be broadened and decentralised in order to achieve better results. If organisational linkage structures are to facilitate maximum participation and ownership, then they should be as close to the grassroots community as possible. Thus, the school heads must, as a matter of necessity, strive actively to attract the cooperation of all agencies in the community to collaborate in the SBESS.

4.21.5 Perceived Students' Roles

Students' perceived roles are shown in Table 30, arranged in a decreasing perceived importance. Students in the schools where SBESS would be based were perceived to have certain important roles to play in the implementation of the system. These roles would help them also to acquire public relations skills.

Table 30

Ranked Perceived Roles of Students in SBESS

Expected Roles of Students	frequencies					
	Total	AEAs	JAST	SAST	JSH	SSH
Prepare model plots	88	13	36	16	18	5
Communicate information to farmers and relatives	50	14	14	7	10	5
Give feedback information	47	17	7	5	8	4
Provide labour for SBESS	43	14	11	7	8	3
Guide visitors to SBESS site	41	17	7	5	8	4
Form Agric. Clubs in school	27	11	4	5	5	2

Source: Data from the study (2004)

The results show that 88 respondents indicated that they expected students in both JSS and SSS primarily to prepare model plots or projects for demonstrations and illustrations to farmers. Secondly, 50 respondents said students should communicate information pertaining to agriculture to farmers, relatives, and friends. Also, 47 respondents expected students to give feedback information to teachers and AEAs for planning, monitoring and evaluation. Students were expected to join the labour force in the exercise and provide labour for SBESS activities (43 respondents). This role was also assigned to farmers as a way of participating in SESS. The next perceived role was guiding visitors to SBESS sites (41respondents). This is finally followed by the formation of agricultural clubs in the school. A close observation of the results reveals that the roles assigned to

students were similar to those of farmers. For example, the provision of labour and formation of farmer groups in the community are the same as the students' roles of providing labour and formation of school clubs.

4.22 Framework for School-based Extension Support System

The results of the study were used to develop a framework for the school-based extension support system in the JSS and SSS. The framework provides a structure for the relevance, objectives, relevant participants, participants' roles to play, time frame for SBESS activities and success indicators. It also provides suggestions for monitoring and evaluation, and for formulating reward systems for employees of MOFA and GES who would spend time and effort in operating the system.

Relevance.

The school-based extension support system is an envisioned system which draws its relevance fundamentally from the low number of agricultural extension agents serving a relatively large number of farmers, mostly in rural communities. In Ghana, the estimated AEA to farmer ratio is 1:1500, a situation which creates grounds for inadequate services and discrimination against poor and less aggressive farmers.

The system potentially enables school-going prospective farmers to have access to extension and agricultural skills that generate in them interest, insight skills and confidence in agricultural practice, and prepare them better for agricultural occupations.

It provides an avenue for inter-ministry cooperation and planning that reduces effort and costs in providing training services for both practicing and prospective farmers.

General Objectives.

The general objective of SBESS is to use the expertise of JSS and SSS agricultural science teachers, and facilities in the schools for teaching agriculture to supplement the extension activities of the agricultural extension agent in the locality. The system is intended to offer the additional benefit of creating awareness, interest and skills among students and teachers of the schools about new technologies and policies in agriculture being promoted in the country by the Ministry of Food and Agriculture.

Specific Objectives

1. Create innovative school farms in the schools.
2. Establish direct linkage between the school and local AEA in the local community.
3. Use school farms as demonstration sites for transferring agricultural innovations.
4. Use the AEA as a resource person in the teaching of practical agriculture in the schools.
5. Use agricultural science teachers as resource persons in agricultural extension support activities in the local community.

6. Create an enabling atmosphere for farmers to visit school farms regularly and at their own free-will to observe innovative practices.

The Role of MOFA and G.E.S.

Provide appropriate policies to guide the operation of SBESS

Monitoring and evaluation of SBESS activities

Decide, approve and provide appropriate rewards and remuneration for participating employees of their respective ministries.

Relevant participants.

Farmers

Agricultural science teachers

Agricultural extension agents

School heads

Students

Roles of Relevant Participants

AEAs' Roles

Furnish agricultural science teachers with technical information

Offer technical advice to farmers

Plan and organize field demonstrations with AST

Direct farmers to visit SBESS schools

Offer technical advice to agricultural science teachers and students

Link school to MOFA Officials

Farmers' Roles

Attend SBESS meetings

Provide information on farmers' needs

Provide labour for SBESS activities

Participate in group activities

Form extension groups

Give feedback information

Agricultural science teachers' roles

Plan SBESS activities with AEA

Organize students for field Activities

Guide visiting farmers

Offer technical advice to Farmers

Direct farmers to AEA

Keep records on SBESS Activities

Link AEA to school administration

School Heads' Roles.

Source for funds for SBESS

Provide policy guidelines for SBESS operation.

Provide school facilities for students' agric. Practical

Supervise SBESS activities

Liaise with collaborators

Students' Roles.

Prepare model plots

Communicate information to farmers and relatives

Give feedback information to AEAs and agricultural science teachers

Provide labour for SBESS activities

Guide visitors to SBESS demonstration site

Form Agric. Clubs in school

Time Frame for Interaction among SBESS Participants

The objectives for SBESS can be achieved through consultations between agricultural science teachers and AEAs regularly, to plan the content, procedures and monitoring criteria for the system. They can meet at any time convenient to them, except in cases of emergency where immediate actions are needed.

Farmers' visits to SBESS sites in schools can take place during school hours where the farmer visitor is supposed to be taken around by a student. Visits outside school hours may be negotiated.

Reward Systems for Stakeholders

This should be the responsibility of the Ministries of Food and Agriculture and the Ghana Education Service of the Ministry of Education and Sports. A stakeholders' workshop would be useful to discuss issues on remuneration for the teaching and extension staff

Success Indicators

Success indicators of SBESS have to reflect the nature and benefits of the system as perceived by stakeholders. They would be useful criteria for the monitoring and evaluation of SBESS activities. The following success indicators were

deduced from the results of the study:

i. The SBESS concept is popularly known to farmers in several communities.

ii. School farms in the JSS and SSS are used as centers for SBESS in their communities.

iii. Most farmers are aware of the SBESS in their communities.

iv. Farmers are seen visiting SBESS centers in their community regularly.

v. AEAs are seen taking active part in organising school farms and practical lessons in the JSS and SSS with the agricultural science teachers.

vi. The AEA is able to use the SBESS to reach more farmers than before.

vii. Agricultural science teachers make greater use of the school farm in teaching practical agriculture.

viii. The expected impact of SBESS, (being greater use of improved agricultural technologies for better livelihood of farmers, and greater knowledge and interest of the educated youth in farming) is clearly observed in the SBESS communities.

Management and Funding

An effective and efficient management is inevitable in ensuring the success and sustainability of every system. SBESS needs to be managed both from outside and inside the system. The internal management would develop cybernetics that would produce an internal regulatory mechanism. This could comprise an executive committee of elected participants. There also needs to be an oversight management that would be responsible for collaborative interactions with donor and technical assistance organisations. This can be in the form of a local

management committee of SBESS participants, local opinion leaders and appointed District Assembly personnel in extension and education.

The sustainability of SBESS will largely depend on true commitment of participants. According to Duvel (2000), true commitment is manifest in real service, placing the interest of the community first. It will also find expression in the priority given to the pursuit of the organisation's (i.e. SBESS's) line of action. This, according to him, calls for downward support within the system that renders maximum support and service to the subordinates from the oversight management. This implies that maximum support for SBESS in terms of funds and technical assistance will be needed from collaborations with NGOs, agro-based industries, companies trading in agricultural commodities and input sellers. A small percentage of the District Assemblies' Common Fund can be reserved for supporting SBESS.

Monitoring, Evaluation and Feedback Mechanisms.

Since conditions will necessarily differ in the various communities and schools in which SBESS would operate, the individual systems must evolve mechanisms for assessing their progress and drawbacks. However, a SBESS monitoring team should be formed from the MOFA , Farmers Groups, the schools, and the universities to oversee the initial development of the system. Such monitoring teams should be open to the various possibilities that could characterize the operations and outcomes of the support system, all capable of yielding desirable outcomes.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter comprises a summary of the findings of the study, and the conclusions drawn from them. Based on the results, some recommendations have been made for action, both in the short and long terms.

5.2 Summary of Findings

The study, conducted in the Central Region of Ghana in six randomly selected districts, was generally aimed at determining the prospect for using the school as the base for establishing an agricultural extension support system. This support system would serve as a means for increasing the efficiency and effectiveness of agricultural extension through the use of Junior and Senior Secondary school agricultural facilities and resources. In the system, the local AEA would plan and implement agricultural technology transfer programmes and activities with agricultural science teachers under the authority and supervision of school heads and District Agricultural Development Officers. Similarly, the agricultural science teacher would plan and execute practical agricultural lessons for students with the local AEA. This would also serve as the linkage between the Ministries

responsible for education and agriculture, both of which are responsible for providing training and education in agriculture to people already engaged in agriculture, as well as those who intend to become farmers.

Specifically, the study sought to:

1. Determine the perception of farmers, agricultural extension agents (AEAs), DDOs, JSS and SSS heads and agricultural science teachers on the prospect for using the school as a centre for diffusing agricultural technology;
2. Determine the factors and conditions that are considered as important in the use of JSS or SSS as centres for agricultural extension support system, as perceived by farmers, AEAs, DDOs, JSS and SSS headmasters and agricultural science teachers;
3. Find the perceived input requirement, in terms of training, equipment, and modifications that have to be made in the school curriculum to make room for the extension support system;
4. Find the perceived linkage levels among agricultural science teachers, AEAs and farmers in the farming communities;
5. Identify the factors considered as important in the motivation of agricultural science teachers and agricultural extension agents to support extra-duty activities;
6. Determine the strengths, opportunities, weaknesses and constraints for SBESS in the JSS and SSS by SWOC analysis based on the perceived availability and levels of the identified factors;
7. Conduct a force field analysis to establish the prospect for the establishment of SBESS in the JSS and SSS;

8. Find the roles of teachers, heads of schools, students, AEAs and farmers in the extension support system as perceived by heads of schools, AEAs, farmers, and Agricultural Science Teachers; and
9. Develop a framework for SBESS in the appropriate educational levels.

5.2.1 Extension Staffing Strength

In all the study districts, there were less than the required numbers of DDOs and AEAs. On the average, DDOs and AEAs at post in the districts represented 62.5 percent and 48.4percent respectively, of the numbers required by policy, thus indicating inadequate staffing. This calls for strengthening of the extension staff.

5.2.2 Demographic Characteristics of Respondents

AEAs, agricultural science teachers, heads of schools and farmers who took part in the study were of varied ages ranging from below 20 years to over 60 years. The group with most varied age was farmers (ages ranging from less than 20 to over 60 years), with heads of Senior Secondary Schools having the least varied ages (41 – 60 years).

Farmers also had the greatest range of work experience in years. While work experience of farmers extended up to 50 years and more, all the other categories had worked in their respective careers for a maximum of 40 years.

Farmers in the region had low level of formal education. Over 47 percent of farmers were not formally educated, and only 4 percent have secondary education or higher. The education level of AEAs is also low. About 96 percent of AEAs

have only General Agriculture certificates. They do not have diploma or degree. Generally, SSS heads have higher education than JSS heads, and SSS agricultural science teachers also have higher education than their JSS counterparts. Generally, most Heads of both JSS and SSS have higher education than their agricultural science teachers. All the identified participants had the basic requisite educational qualification to operate professionally in their respective positions.

5.2.3 Identified Relevant Participants in SBESS

The relevant participants identified for SBESS in the study were farmers, agricultural science teachers in junior and senior secondary schools, agricultural extension agents (AEAs), headmasters or headmistresses of schools, and students taking agricultural science as a subject (students).

5.2.4 Need for Extension Support System

Generally, the need for an extension support system was perceived as important. All categories of respondents with the exception of agricultural science teachers in Senior Secondary Schools, considered the need for an extension support system in the region as important.

5.2.5 Stakeholders' Perceived Need For SBESS

DDOs, AEAs, farmers and JSS agricultural science teachers perceived the concept of SBESS as very important. Heads of JSS and SSS considered it as important, but SSS agricultural science teachers perceived it as being of little importance.

5.2.6 Perceived Prospect For A School-based Extension Support System

All identified respondent categories coming from different educational and occupational backgrounds, perceived SBESS as having high prospect. Although farmers and agricultural extension personnel are not part of the work force of the school system, their level of confidence in the participation of the formal education system in extension delivery programmes was high. Prospect for SBESS in Junior Secondary schools were, however, perceived to be higher than in the Senior Secondary schools.

5.2.7 Perceived Factors and Conditions that Influence the Use of JSS or SSS as Centres for SBESS

The major factors perceived to influence the prospect of SBESS were stakeholders' perception about SBESS, the time schedule of participants, extension competencies of AEAs and agricultural science teachers, and their level of motivation and attitudes toward participating in SBESS, availability of required funding, level of education of relevant of AEAs and agricultural science teachers participants, role clarity among participants, presence and suitability of school farms in schools for demonstrations the presence of active students agricultural clubs in schools, and supervision. The strong influence of individuals' perceptions on the practicability of ideas was demonstrated in the study results, when the strongest perceived factor in the SBESS prospect assessment was the perceptions individual stakeholders hold about the envisioned system. Time, available for agricultural science teachers to engage in extension activities on the school farm, was the second most important factor determining the prospect for SBESS.

5.2.8 Perceived Input Requirement (Training, Equipment and Curriculum) to Facilitate SBESS

Schools in which SBESS would be based were expected to satisfy the following conditions:

1. Schools should have basic agricultural equipment and facilities, the major ones among which are school farms, apiary, snailery, poultry house, simple farm tools, and farm assistants.
2. At least a day should be allocated on the school agriculture timetable for practical fieldwork, and for farmers' visits.
3. Students must be trained to receive and direct visiting farmers to SBESS site, and to discuss problems and activities with them.
4. Other members of staff in the schools, apart from the agricultural science teacher, should be aware of, and involved in the planning of SBESS programmes.
5. Schools must have active students' agricultural clubs, and
6. Farmers in the community must have active farmer groups in the local communities.

5.2.9 Perceived Linkage Levels among Agricultural Science Teachers, AEAs and Farmers in the Farming Communities

AEAs perceived the level of interaction between themselves and agricultural science teachers as very low. However, they perceived their interaction with farmers as very high and frequent, since it is the main focus of their work.

Farmers perceived themselves having more frequent consultation with JSS agricultural science teachers than with SSS agricultural science teachers. The farmers perceived themselves as showing an average level of interaction with JSS agricultural science teachers, while none of the farmers had ever consulted any SSS agricultural science teachers for technical advice or information in agriculture. JSS Agricultural science teachers indicated low level of consultations between themselves and AEAs, and farmers. The senior secondary schools agricultural science teachers had very low level of consultations with farmers and extension agents.

5.2.10 The School Farm Situation

Although all SSS in the study had school farms, most of them were in poor and abandoned condition. Only about 24 percent were in good condition and could be suitable to serve as SBESS farms. Approximately 38 percent of JSS did not have school farms at all. However, almost 37 percent JSS had school farms that were in good condition to serve as SBESS demonstration sites. Some school farms were too far away from the school premises and the community to be used for SBESS.

5.2.11 Participant Motivation for SBESS

The study revealed a generally high level of motivation among all categories of relevant participants identified for SBESS. JSS agricultural science teachers were found to show the highest level of motivation to participate in

SBESS with 84 percent of them rating themselves as very highly motivated. The least motivated group was SSS agricultural science teachers who were perceived as unlikely active participants in SBESS

5.2.12 Factors that Influence Motivation to Participate in SBESS

Respondents identified the following motivating factors, listed in descending order of importance, as the basis for their motivation to participate in agricultural extension programmes in the category of SBESS:

1. Improved income,
2. Sympathy for other peoples problems,
3. Work made easier through SBESS,
4. Participants having interest in the work,
5. Appreciation for the work done in SBESS,
6. Survival in the occupation of the individual,
7. Promotion or growth in one's occupation,
8. Good working conditions,
9. Self fulfilment, and
10. Personal loyalty to other stakeholders.

5.2.13 Driving Forces for SBESS in JSS

The following were identified in the study as the major driving forces that heighten the prospect for the implementation of SBESS in the JSS:

1. There were high levels of motivation among agricultural science teachers and AEAs to participate in SBESS,

2. There is adequate time for agricultural science teachers to get involved in SBESS activities in their schools.
3. There exists cooperation between JSS agricultural science teachers and local AEAs.
4. .Competence levels of AEAs and JSS agricultural science teachers are adequate.
5. Educational backgrounds of JSS agricultural science teachers are suitable.
6. JSS agricultural science teachers have positive attitudes toward SBESS.

5.2.14 Restraining Forces of SBESS in the JSS

The major restraining forces that threaten the prospect for SBESS in the JSS were identified and ranked in order of descending importance as:

1. There is extremely low level of formal education among farmers
2. There is adequate supply of simple agricultural implements and equipment in the schools.
3. There is inadequate supervision of agricultural activities in the schools
4. There are no suitable school farms in the JSS.
5. There is non-existence of active students' agriculture clubs in the JSS.
6. There is lack of role clarity among relevant participants.

5.2.15 Driving Forces for SBESS in SSS

1. Agricultural science teachers in the SSS have favourable attitudes and high levels of motivation towards SBESS

2. Agricultural science teachers and AEAs have suitable levels of formal education
3. Agricultural science teachers and AEAs have suitable levels of competence
4. There are suitable school farms for SBESS in the SSS.

5.2.16 Restraining Forces for SBESS in SSS

Forces restraining the prospect of SBESS in the SSS were identified in a descending order of importance as:

1. There is low level of formal education among farmers
2. there are no active students' Agric Club in schools
3. There is inadequate funding
4. There is inadequate supervision of agricultural activities
5. School farms are too far away from the community
6. Agricultural equipment are not adequately available in the schools.
7. There is lack of role clarity among the relevant participants
8. There is lack of cooperation between AEAs and SSS agricultural science teachers

5.2.17 Institutional Challenges to SBESS.

The major institutional challenges perceived to face SBESS were

1. How to link the system to both the demands of school curriculum and the farmer.

2. Inadequate institutional capacity to manage SBESS effectively and efficiently.
3. Motivating agricultural extension personnel and agricultural science teachers to be actively involved in the system,
4. Getting farmers to visit school farms in order to learn technologies displayed and demonstrated there.
5. Conflicting demands of various school enterprises
6. Networking among the SBESS centers and stakeholders
7. Developing methods for encouraging students' independent participation in SBESS
8. Motivating students
9. Coping with policy issues,
10. Creating partnership and assistance from NGOs and other agencies
11. Coping with staff turnover
12. Gender mainstreaming.

5.2.18 Prospect for SBESS.

The prospect for the establishment of SBESS in schools in the farming communities are positive in both JSS (0.1732) and SSS (0.1042). The prospect for the JSS are brighter than for the SSS. Less effort is, therefore, required to establish SBESS in the JSS than in the SSS. This indicates a requirement for the development of a change strategy in farming communities, as recommended by Wilson (1992), to enhance the facilitation of SBESS.

5.3 Conclusions

The following research questions raised in this study served as the basis for drawing conclusions from the findings:

1. How do farmers, agricultural extension agents (AEAs), district agricultural development officers (DDOs), headmasters and agricultural science teachers in both JSS and SSS perceive the use of the JSS and SSS perceive the use of JSS and SSS as centres for agricultural extension support system?
2. What are the factors and conditions that are considered as important in the use of JSS and SSS as centres for agricultural extension support system?
3. What are the linkage levels among agricultural science teachers, AEAs and farmers in the farming communities?
4. What are the factors that influence the motivation of teachers and agricultural extension agents to support extra-duty activities?
5. What are the strengths and opportunities, weaknesses and constraints for SBESS in the SSS and JSS as perceived by respondents?
6. What is the prospect level of SBESS as indicated by force field analysis of the assessment by each respondent category?

The conclusions arrived at from the findings of the study were as follows:

1. School-based extension support system (SBESS) is generally considered as an important concept. SBESS was perceived to have a highly positive prospect in the JSS, but its prospect in the SSS was perceived to be very low. Thus, the JSS,

which are more community–based, were considered to be more suitable as a base for SBESS.

2. Factors and conditions that were considered as important in the use of JSS and SSS for an agricultural support system could be categorised into three as participants' personal attributes, institutional factors and infrastructural situation.

The perceptions of participants, their competencies, their motivation, level of education and attitudes are the major personal attributes of participants that could influence the use of the JSS and SSS for SBESS in their communities. The availability of funding, adequacy of supervision, presence of farmer-based organisations in the community and students' agricultural clubs in the schools could be considered as institutional factors that were found to influence the use of the schools as the base for extension support system. Infrastructural factors perceived to influence the use of the schools for SBESS were adequacy of agricultural inputs and equipment in the schools, the presence and suitability of school farms in the JSS and SSS, and distance of the school farms from the school premises.

3. Farmers had no occupational consultations with SSS agricultural science teachers but had fairly frequent consultations with JSS agricultural science teachers. This could be one major reason why farmers did not consider the SSS as a suitable base for an extension support system. Farmers' interaction with AEAs was, on the average, very frequent. Also, AEAs very rarely consulted with SSS agricultural science teachers, but occasionally consulted JSS agricultural science teachers. There was a stronger level of confidence among those categories of respondents who interacted more frequently among themselves. Farmers

in region were found to have very low levels of formal education, and most AEAs in the Region had no diploma or degree. Thus, the formal educational levels of both farmers and AEAs in the Region were low. The theoretical implication is that frequent interaction between human systems can create confidence and mutual relationships.

4. Hygiene factors (Herzberg, Mausner and Synderman, 1959) were the highest ranked motivating factors for participants' desire to participate in SBESS. Hygiene factors include company policy and administration, supervision, relations with others, work conditions, salary, status, personal life and security. Motivators include achievement, recognition, work itself, advancement, and growth. Ranking of motivating factors for participation in SBESS did not follow exactly the order indicated in Maslow's (1943) hierarchy of needs. The strategy for motivating SBESS participants depends on which motivation theories are used as a reference point. However, regardless of which theory is followed, interest in work and participants' remuneration (financial benefits) appear to be very important links to higher motivation of SBESS participants.

5. The major driving forces for SBESS are: favourable attitudes, high levels of motivation, suitable levels of formal education and competence on the part of agricultural science teachers and agricultural extension agents, and the presence of suitable school farms for SBESS in the schools.

The most critical restraining forces for SBESS in the Central Region are (a) low level of formal education among farmers, (b) inadequate funding, (c) inadequate supply of simple agricultural implements and equipment in the schools, (d) Non-existence of active students' Agric Club in schools, and (e) inadequate

supervision of agricultural activities in the schools

6. Based on a force field analysis of driving and restraining forces the prospect for SBESS in the both the JSS and SSS were positive. Prospect in the JSS was however greater than in the SSS. SBESS can therefore be said to be more feasible in the JSS than the SSS. The perceived estimation of the prospect for SBESS in the JSS and SSS from the perception of respondents agreed with the estimation by force field analysis. However, while the prospect were perceived as very high for the JSS and high for SSS, the force field analysis showed moderately high prospect in both the JSS and SSS. The implication is that perceptions could be relied upon for nominal and ordinal estimations but could produce distortions in estimating quantitative values.

5.4 Policy Implications

The results of this study have implications for both agricultural extension and education policies.

1. The study revealed a persistence of inadequate number of extension staff catering for educational and technological needs of farmers who have very low level of formal education. The numbers of both DDOs and AEAs were below the required staff level.

    a. This calls for action to recruit more extension staff, and also provide adequate training to equip them with communication and adult learning facilitation skills that are suitable for effective communication with farmers.

b. This also means that the practice of re-posting graduate extension staff who have rather acquired greater facilitation skills to Regional and District offices needs to be revised. It would be better for the MOFA to create conducive occupational conditions for these graduates to stay in the rural communities and work directly with farmers. This would make their training relevant to both the graduates themselves, their clientele farmers and to the government.

c. On the other hand, alternative extension support systems such as SBESS have to be developed to supplement the activities of the few extension staff. This suggestion finds support in the study results in the sense that the prospect for SBESS was positive, especially in the JSS. The envisioned school based extension support system, therefore, have to be embraced developed and supported by an appropriate educational and agricultural policies to yield the expected benefits.

2. The latest curriculum reform in the Ghana Education Service suggests the discontinuance of the teaching of agricultural science in the JSS, as a subject. Instead, students will be taught science and environmental studies. This would mean that SBESS would lose its practicability and relevance in the JSS. In the last two decades, there have been several changes and inconsistencies in the agricultural science curriculum and structure at both the basic and secondary schools, thus making the subject unattractive to students. For SBESS to be realistically instituted, therefore, there is the need for a more stable policy on agricultural education in the basic and secondary schools

3. Several JSS do not have school farms, an indication that the teaching of agriculture in these schools is basically theoretical without any practical demonstrations. This is capable of creating a weak foundation and low interest in agricultural science among students.

a. Flexible time tabling and provision of means of transport to schools on community basis would enable schools situated in places where there is no space for farms to undertake practicals on other school farms.

b. Various alternatives to school farms have to be exploited by agricultural science teachers and AEAs for teaching practical agriculture; for instance, basket gardens, potted planting and earth box gardening may be introduced.

3. Weak interpersonal and institutional linkages observed in the study reflect a lack of clear policy on linkages between the formal and functional education systems, and specifically, between agricultural extension for educating farmers, and agricultural science teaching in schools to educate young people in agriculture. The Ministry of Education and Sports, in particular, does not consider the operation of agricultural extension agents in the schools as part of the curriculum. .There is the need to formulate a clear linkage policy to harmonise the goals of the formal and non-formal agricultural education. The very low level of education found among farmers in the region has obvious implications on the farmers' ability to participate in various agricultural extension activities and programmes, and their ability to search for and use information from various sources.

5.5 Recommendations

1. The school based extension support system is recommended to MOFA and MOES for its use to improve the opportunities for practical agricultural learning among the school going youth, and the efficiency of extension delivery to farmers.
2. Inadequate extension staff poses a threat to the effectiveness and efficiency of extension services in the Central Region. This calls for the strengthening of the extension staff through expanded training and employment of more extension staff.
3. Improved conditions of service must be considered as a means of retaining personnel in the service.
4. Special efforts should be made to admit more AEAs from the Central Region into the SAFE programme to study for their diploma or degree in agricultural extension. This is the feasible way to deal with the low level of education among AEAs in the region. This recommendation takes into consideration the relatively low average age of AEAs that indicates that after training in higher institutions, MOFA and farmers will continue to benefit from their expertise for a long time.
5. It is recommended that instead of total discontinuance of agricultural science, in the JSS as recommended in the new JSS curriculum, gardening should be introduced to the basic schools as a practical subject, just as Physical Education. Inter-class and inter-schools competitions in gardening could be instituted as a permanent feature of basic education. Also,

farming equipment must be purchased for school agriculture with the same zeal and official backing as is done for the purchasing of sports materials. This can stimulate agricultural club formation and strengthen the agricultural base in the JSS for effective use in SBESS.

6. In order to mitigate the negative effects of farmers' low level of formal education, governments' functional literacy programme, operated under the Ministry of Education and Sports in the various communities, has to be re-examined and restructured to benefit more farmers, so that they can improve upon their literacy levels. Also, labelling and instructions on farm inputs such as fertilisers, insecticides, seeds and implements must be in languages that can be read and understood easily by farmers with low educational levels.

7. For a change strategy, the five most critical restraining forces to SBESS, namely: Low level of formal education among farmers, inadequate funding, inadequate supply of simple agricultural implements and equipment in the schools, njon-existence of active students' Agric Club in schools, and inadequate supervision of agricultural activities in the schools, must, as a priority, be attended to by District Educational and Agricultural sub-committees in the various District Assemblies in order to enhance the feasibility of SBESS.

   a. Low level of formal education was found to be the most dominant restraining factor for the prospect of SBESS. MOFA personnel must offer themselves as voluntary facilitators in the functional literacy classes that are organised by the Ministry of Education and Sports to

reduce the level and intensity of illiteracy among farmers in the Region.

b. Inadequate funding and inadequate supply of simple agricultural implements and equipment in the schools hinder most practical agricultural activities in schools Heads of schools need to link up with benevolent individuals and organisations to support school agricultural activities, either with funds of equipment for practical training. In this way there could be adequate funds to cater for money and equipment needed for starting SBESS.

c. Students' Agricultural clubs could be used as tools for arousing students' interest and participation in agricultural programmes. Agricultural club activities could be organised in schools using the approach for organising sporting and athletic clubs in the schools. This needs to be done, encouraged and rewarded as part of the curriculum for the school. Individual, inter-group and interschool competitions could be organized in theory and practical agriculture within and among the clubs to give them purpose and focus. Competitions would also help to keep the clubs alive.

d. Supervision of agricultural activities in the schools is not satisfactory. Several heads of schools would not supervise the activities of a programme because they do not have adequate information about what to do and what to expect. Supervisors (usually heads of schools) must be given orientation on what to expect in SBESS from agricultural science teacher and students, the AEA and farmers who would visit

the school for the SBESS activities. Similarly, DDOs need to monitor and supervise the activities of the AEAs and farmers in particular. They must be given orientation to know when and how to supervise, and what should be supervised. This will ensure that the activities of all relevant participants are coordinated and purposeful.

8. In order to make SBESS a reality a series of workshops must be organised to bring stakeholders together to discuss the management and practice of SBESS in the communities based on the findings of this study, as part of real-life activities in farming communities.

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APPENDICES

APPENDIX A

INTERVIEW SCHEDULE FOR FARMERS

1. Sex: 1. Male [ ] 2. Female [ ]
2. District.....

3. Highest level of formal education attained
   1. No formal education
   2. Primary
   3. Middle school/JSS
   4. Farm Institute
   5. Senior Secondary/Technical/Commercial School
   6. Agricultural College Certificate
   7. Diploma institution/Polytechnic
   8. University

4. What is your age category?
   1. Under 20 years
   2. 20 – 30 years
   3. 31 – 40 years
   4. 41 – 50 years
   5. 50 – 60 years
   6. 60 – 70 years
   7. Over 70 years

5. For how many years have you been a farmer?.....

6. Do you think it is important to find a new way to help the extension agent in your community to serve more farmers?
   5. Very important
   4 Important
   3. Moderately important
   2. Of low importance
   1. Not important

7. Which of the following kinds of personalities would suggest should be active participants in a programme that would be a support system to the extension agent in your community?

The local Agricultural Extension Agent	[ ]
District Agricultural Development Officer	[ ]
Farmer	[ ]
JSS Agricultural Science Teacher	[ ]
JSS headmaster/headmistress	[ ]
Agricultural science teacher	[ ]

SSS headmaster/headmistress [ ]
Student [ ]

8. How would you rate your level of motivation to participate in the kind of programme that would be a support system to the extension agent in your community?

5. Very High 4. High 3. Moderate 2. Low 1.Very low

9. Indicate by choosing the appropriate number, the frequency at which you hold consultations on farming problems with the following personalities

Kind of personality	5. very frequent	4 frequent	2.Occasional	1. Not at all
AEAs				
JSS AGRIC. TEACHERS				
SSS AGRIC TEACHERS				

10. If the Extension officer decides to use the school's facilities and farm for extension demonstrations, state one role you expect the following people to play

a. Yourself

.....

.....

b. The agricultural extension agent

.....

.....

c. The school agricultural science teachers

.....

.....

d. The school headmaster

.....

.....

11. Rank the following motivating factors in order of reducing importance (most important first) how they influence you to participate in extension activities.

[ ]

Improved income
Sympathy to other people's problems. [ ]
Work made easier [ ]
Interesting work [ ]
Appreciation by beneficiaries of work done in [ ]
Survival in occupation [ ]
Promotions and occupational growth [ ]
Good working conditions [ ]
Self-fulfilment [ ]
Personal loyalty to Stakeholders [ ]

12. List four important things that you think must be available in the school and community before the extension agent can use the school facilities for teaching new technologies to farmers.....

THANK YOU

APPENDIX B

PHASE 1 QUESTIONNAIRE FOR AGRICULTURAL EXTENSION AGENTS

1. District.....

2. Operational Area.....

Please put a tick (√) against your response to the following questions.

3. Sex: 1. Male [ ] 2. Male [ ]

4. Highest level of formal education attained
   1. Middle school/JSS
   2. Senior Secondary
   3. Agricultural college Certificate
   4. Diploma
   5. Degree

5. What is your age category?
   1. 20 – 30 years
   2. 31 – 40 years
   3. 41 – 50 years
   4. Over 50 years

6. For how many years have you worked as An AEA?.....

7. Do you think it is important to find a new way to help you as the extension agent in your community to serve more farmers?
   1. Very important
   2 Important
   3. Moderately important
   4. Of low importance
   5. Not important

8. How would you rate the prospect for the development of a system based in schools for supporting the extension system in the farming community?

5. Very High prospect	[ ]
4. High prospect	[ ]
3. Moderate prospect	[ ]
2. Low prospect	[ ]
1. Very Low prospect	[ ]

9. Which of the following kinds of personalities would suggest should be active participants in a programme that would be a support system to the

extension agent in your community? (Please tick X in the box)

The local Agricultural Extension Agent	[ ]
District Agricultural Development Officer	[ ]
Farmer	[ ]
JSS Agricultural Science Teacher	[ ]
JSS headmaster/Headmistress	[ ]
Agricultural Science Teacher	[ ]
SSS headmasters /headmistress	[ ]
Student	[ ]

10. How would you rate the possibility of you developing the school farm in the local JSS with the agricultural science teacher, to serve as a technology demonstration center?

5. Very High 4. High 3. Moderate 2. Low 1. Very Low

11. How would you rate your level of motivation to participate in the kind of programme that would be a support system to the extension agent in your community?

5. Very High 4. High 3. Moderate 2. Low 1. Very Low

12. Indicate by choosing the appropriate number, the frequency at which you hold consultations on farming problems with the following personalities

KIND OF PERSONALITY	5. very frequent	4 frequent	2.Occasional	1. Not at all
AEAs				
JSS AGRIC. TEACHERS				
SSS AGRIC TEACHERS				

13. If the Extension officer decides to use the school's facilities and farm for extension demonstrations, what roles do you expect the following people to play?

a. Yourself
.....
.....

b. The Agricultural Science Teacher
.....
.....

headmaster/headmistress

c. The School

.....
.....

d. The farmer

.....
.....

e. The Student

.....
.....

14. List four important requirements that you think must be available in the school and community before the extension agent can use the school as a base for teaching new technologies to farmers.

.....
.....
.....

15. How important do you perceive each of the following factors to be in the prospect for the school-based extension support system? Please use the scale below and circle your response:

VI = Very important
MI = Moderately important
SI = Slightly important
NI = Not important

	FACTOR / INPUT / CONDITION	Perceived Importance			
1	Motivation of agricultural science teachers	VI	MI	SI	NI
2	Motivation of AEAs	VI	MI	SI	NI
3	Competency of Agricultural Science Teachers	VI	MI	SI	NI
4	Competency of Agricultural Extension Agents	VI	MI	SI	NI
5	Age of Agricultural Science Teachers	VI	MI	SI	NI
6	Age of Agricultural Extension Agents	VI	MI	SI	NI
7	Age of farmers	VI	MI	SI	NI
8	Educational level of Agricultural Science Teachers	VI	MI	SI	NI
9	Educational level Agricultural Extension Agents	VI	MI	SI	NI
10	Educational level of farmers	VI	MI	SI	NI
11	Knowledge of roles to be played by stakeholders	VI	MI	SI	NI
12	Attitude of teachers toward the school-based extension support	VI	MI	SI	NI
13	Attitudes of farmers toward the support system	VI	MI	SI	NI
14	Attitudes of AEAs toward the school-based extension support	VI	MI	SI	NI
15	Cooperation between AEAs and Agric. Science teachers	VI	MI	SI	NI

16	Formal linkage between Extension Department and School	VI	MI	SI	NI
17	Informal linkages between AEA and School	VI	MI	SI	NI
18	Existing interactions between farmers and the school	VI	MI	SI	NI
19	Interactions between farmers and JSS Agric. Science teacher	VI	MI	SI	NI
20	Existence of official policy on extension-school linkages	VI	MI	SI	NI
21	Availability of school farm in the JSS	VI	MI	SI	NI
22	Availability of modern agricultural equipment and facilities in the school	VI	MI	SI	NI
23	Distance of school from town/village	VI	MI	SI	NI
24	Distance of school farm from town/village	VI	MI	SI	NI
25	Compatibility of extension programmes to school curricula	VI	MI	SI	NI
26	Existence of Farmer-based Organisations / Farmer groups	VI	MI	SI	NI
27	Students' attitudes	VI	MI	SI	NI
28	Existence of active Agriculture Clubs in the school	VI	MI	SI	NI
29	Adequate funding	VI	MI	SI	NI
30	Adequate supervision	VI	MI	SI	NI

16. Any comments.....

.....

.....

Thank you.

APPENDIX C

PHASE 2 QUESTIONNAIRE TO AGRICULTURAL EXTENSION AGENTS

1.
District.....

2. Operational
area.....

3. What are the three top constraints you have for using the school as a base for your agricultural activities?

a. .....
b. .....
c. .....

4. To what level do you think the following factors are available for you to use the JSS as a base for your extension activities? Please circle your response using the scale below:

VH = Very High
H = High
M = Moderate
L = Low
VL = Very Low

	FACTOR / INPUT / CONDITION	Perceived Level of availability/existence				
1	Motivation of agricultural science teachers	VH	H	M	L	VL
2	Motivation of AEAs	VH	H	M	L	VL
3	Educational level of AEAs	VH	H	M	L	VL
4	Knowledge of roles you have to play to use the school as a support for your extension programmes	VH	H	M	L	VL
5	Attitudes of farmers toward the school-based support system	VH	H	M	L	VL
6	Attitudes of AEA toward the school-based support system	VH	H	M	L	VL
7	Formal linkage between Extension Department and School	VH	H	M	L	VL
8	Informal linkages between AEA and School	VH	H	M	L	VL
9	Interactions between AEA and Agric. Science Teacher	VH	H	M	L	VL
10	Clarity of policy on the use of schools and their facilities for extension programmes and activities.	VH	H	M	L	VL

11	Interactions between farmers and JSS Agric. science teacher	VH	H	M	L	VL
12	Distance of school from the local community	VH	H	M	L	VL
13	Adequate funding	VH	H	M	L	VL
14	Adequate supervision	VH	H	M	L	VL

5. To what degree do you have a clear knowledge about what role you are expected to play in the extension support system?

a. Very clear
b. Moderately clear
c. Slightly clear
d. Not clear

6. Rank the following motivating factors in order of reducing importance (most important first) how they influence you to participate in extension activities.

Improved income [ ]
Sympathy to other people's problems. [ ]
Work made easier [ ]
Interesting work [ ]
Appreciation by beneficiaries of work done in [ ]
Survival in occupation [ ]
Promotions and occupational growth [ ]
Good working conditions [ ]
Self-fulfilment [ ]
Personal loyalty to Stakeholders [ ]

7. List the following identified institutional challenges in order of reducing importance as they would apply to the use of the school as the base for an extension support system

Linking SBESS to both school curriculum and Farmers' needs [ ]
Motivating extension workers and teachers [ ]
Getting farmers to visit the school farms regularly [ ]
Conflicting demands on the school farm enterprises [ ]
Networking/cooperation among SBESS actors and centers [ ]
Developing methods to encourage Students' participation. [ ]
Students' motivation [ ]
Policy barriers [ ]
Partnership and assistance from NGOs and other organisations [ ]
Coping with staff turn-over [ ]
Gender mainstreaming [ ]

THANK YOU

APPENDIX D

PHASE 1 QUESTIONNAIRE FOR DISTRICT AGRICULTURAL DEVELOPMENT OFFICERS (DDOS)

1. District.....

Please put a tick (√) against your response to the questions.

2. Highest level of formal education attained
   9. Middle school/JSS
   10. Senior Secondary
   11. Agricultural college Certificate
   12. Diploma
   13. Degree

3. What is your age category?
   8. 20 – 30 years
   9. 31 – 40 years
   10. 41 – 50 years
   11. Over 50 years

4. For how many years have you worked in the MOFA?.....

5. Do you think it is important to find a new way to help the extension agents in your district to serve more farmers?
   5. Very important
   4 Important
   3. Moderately important
   2. Of low importance
   1. Not important

6. How would you rate the prospect for the development of a system based in schools for supporting the extension system in the farming community?

5. Very High prospect	[ ]
4. High prospect	[ ]
3. Moderate prospect	[ ]
2. Low prospect	[ ]
1. Very Low prospect	[ ]

7. Which of the following kinds of personalities would suggest should be active participants in a programme that would be a support system to the extension agent in your community? (Please tick X in the box)

The local Agricultural Extension Agent	[ ]
District Agricultural Development Officer	[ ]

Farmer	[ ]
JSS Agricultural Science Teacher	[ ]
JSS headmaster/headmistress	[ ]
Agricultural science teacher	[ ]
SSS headmaster/headmistress	[ ]
Student	[ ]

8. If the Extension officer decides to use the school's facilities and farm for extension demonstrations, what roles do you expect the following people to play?

a. Yourself

.....

.....

b. The Agric. Extension Agent

.....

.....

c. School headmaster/headmistress

.....

.....

d. The school agricultural science teachers

.....

.....

e. The farmer

.....

.....

f. The student

.....

9. List four important things that you think must be available in the school and community before the extension agent can use the school facilities for teaching new technologies to farmers.

.....

.....

.....

10. How important do you perceive each of the following factors to be in the prospect for the school-based extension support system? Please use the scale below and circle your response:

VI = Very important
MI = Moderately important
SI = Slightly important
NI = Not important

	FACTOR / INPUT / CONDITION	Perceived Importance			
		VI	MI	SI	NI
1	Motivation of agricultural science teachers				

2	Motivation of AEAs	VI	MI	SI	NI
3	Competency of Agricultural Science Teachers	VI	MI	SI	NI
4	Competency of Agricultural Extension Agents	VI	MI	SI	NI
5	Age of Agricultural Science Teachers	VI	MI	SI	NI
6	Age of Agricultural Extension Agents	VI	MI	SI	NI
7	Age of farmers	VI	MI	SI	NI
8	Educational level of Agricultural Science Teachers	VI	MI	SI	NI
9	Educational level Agricultural Extension Agents	VI	MI	SI	NI
10	Educational level of farmers	VI	MI	SI	NI
11	Knowledge of roles to be played by stakeholders	VI	MI	SI	NI
12	Attitude of teachers toward the school-based extension support	VI	MI	SI	NI
13	Attitudes of farmers toward the support system	VI	MI	SI	NI
14	Attitudes of AEAs toward the school-based extension support	VI	MI	SI	NI
15	Cooperation between AEAs and Agric. Science teachers	VI	MI	SI	NI
16	Formal linkage between Extension Department and School	VI	MI	SI	NI
17	Informal linkages between AEA and School	VI	MI	SI	NI
18	Existing interactions between farmers and the school	VI	MI	SI	NI
19	Interactions between farmers and JSS Agric. Science teacher	VI	MI	SI	NI
20	Existence of official policy on extension-school linkages	VI	MI	SI	NI
21	Availability of school farm in the JSS	VI	MI	SI	NI
22	Availability of modern agricultural equipment and facilities in the school	VI	MI	SI	NI
23	Distance of school from town/village	VI	MI	SI	NI
24	Distance of school farm from town/village	VI	MI	SI	NI
25	Compatibility of extension programmes to school curricula	VI	MI	SI	NI
26	Existence of Farmer-based Organisations / Farmer groups	VI	MI	SI	NI
27	Students' attitudes	VI	MI	SI	NI
28	Existence of active Agriculture Clubs in the school	VI	MI	SI	NI
29	Adequate funding	VI	MI	SI	NI
30	Adequate supervision	VI	MI	SI	NI

11. Any comments.....

Thank you.

APPENDIX E

SECOND PHASE QUESTIONNAIRE FOR DISTRICT AGRICULTURAL DEVELOPMENT OFFICERS

1. District

.....

2. How would you rank the levels of availability and quality of the following inputs in your school adequately enough to support agricultural technology transfer? (Circle your response, using the scale below)

5 VH = Very High
4 H = High
3 M = Moderate
2 L = Low
1 VL = Very Low

	FACTOR / INPUT / CONDITION	5	4	3	2	1
1	Motivation of agricultural science teachers	VH	H	M	L	VL
2	Competency of Agricultural Science Teachers	VH	H	M	L	VL
3	Educational level of Agricultural Science Teachers	VH	H	M	L	VL
4	Educational level of farmers	VH	H	M	L	VL
5	Knowledge of roles to be played by stakeholders	VH	H	M	L	VL
6	Attitude of teachers toward the school-based extension support	VH	H	M	L	VL
7	Attitudes of farmers toward programmes in the school	VH	H	M	L	VL
8	Cooperation between AEAs and Agric. Science teachers	VH	H	M	L	VL
9	Size of school of school farm	VH	H	M	L	VL
10	Modern agricultural equipment and facilities in the school	VH	H	M	L	VL
11	Distance of school farm from town/village	VH	H	M	L	VL
12	Existence of Farmer-based Organisations / Farmer groups	VH	H	M	L	VL
13	Existence of active Agriculture Clubs in the school	VH	H	M	L	VL
14	Adequate funding	VH	H	M	L	VL
15	Adequate supervision	VH	H	M	L	VL

4. To what degree do you have a clear knowledge about what role you are expected to play in the extension support system?

e. Very clear
f. Moderately clear
g. Slightly clear

h. Not clear

5. List the following identified institutional challenges in order of reducing importance as they would apply to the use of the school as the base for an extension support system

Linking SBESS to both school curriculum and Farmers' needs	[ ]
Motivating extension workers and teachers	[ ]
Getting farmers to visit the school farms regularly	[ ]
Conflicting demands on the school farm enterprises	[ ]
Networking/cooperation among SBESS actors and centers	[ ]
Developing methods to encourage Student participation.	[ ]
Students motivation	[ ]
Policy barriers	[ ]
Partnership and assistance from NGOs and other organisations	[ ]
Coping with staff turn-over	[ ]
Gender mainstreaming	[ ]

7. Any comments or suggestions.....
.....
.....

THANK YOU

APPENDIX F

PHASE 1 QUESTIONNAIRE FOR JSS AND SSS HEADMASTERS

1. District.....

2. School.....

Please put a tick (√) against your response to the questions.

Sex: 1. Male [ ] 2. Male [ ]

3. Highest level of formal education attained
   1. Middle school/JSS
   2. Senior Secondary
   3. Agricultural college Certificate
   4. Diploma
   5. Degree

4. What is your age category?
   1. 20 – 30 years
   2. 31 – 40 years
   3. 41 – 50 years
   4. Over 50 years

5. For how many years have you worked as a teacher?.....

6. Do you think it is important to find a new way to help the extension agent in your community to serve more farmers?
   5. Very important
   4 Important
   3. Moderately important
   2. Of low importance
   1. Not important

7. How would you rate the prospect for the development of a system based if schools for supporting the extension system in the farming community?

5. Very High prospect	[ ]
4. High prospect	[ ]
3. Moderate prospect	[ ]
2. Low prospect	[ ]
1. Very Low prospect	[ ]

8. Which of the following kinds of personalities would suggest should be active participants in a programme that would be a support system to the

extension agent in your community? (Please tick X in the box)

The local Agricultural Extension Agent	[ ]
District Agricultural Development Officer	[ ]
Farmer	[ ]
JSS Agricultural Science Teacher	[ ]
JSS headmaster/headmistress	[ ]
Agricultural science teacher	[ ]
SSS headmaster/headmistress	[ ]
Student	[ ]

9. How would you rate your level of motivation to participate in the kind of programme that would be a support system to the extension agent in your community?

5. Very High 4. High 3. Moderate 2. Low 1. Very Low

10. Indicate by choosing the appropriate number, the frequency at which you hold consultations on farming problems with the following personalities

KIND OF PERSONALITY	5. very frequent	4 frequent	2.Occasional	1. Not at all
AEAs				
JSS AGRIC. TEACHERS				
SSS AGRIC TEACHERS				

11. If the Extension officer decides to use the school's facilities and farm for extension demonstrations, what roles do you expect the following people to play?

a. Yourself.....

.....

b. The Agric. Extension Agent

.....

.c. The School Agricultural Science Teachers...

.....

d. The farmer.....

.....

e. The Student .....

.....

f. The District Agricultural Development Officers

.....

12. List four important things that you think must be available in the school and community before the extension agent can use the school facilities for teaching new technologies to farmers.

.....

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.....

13. How important do you perceive each of the following factors to be in the prospect for the school-based extension support system? Please use the scale below and circle your response:

VI = Very important
MI = Moderately important
SI = Slightly important
NI = Not important

	FACTOR / INPUT / CONDITION	Perceived Importance			
1	Motivation of agricultural science teachers	VI	MI	SI	NI
2	Motivation of AEAs	VI	MI	SI	NI
3	Competency of Agricultural Science Teachers	VI	MI	SI	NI
4	Competency of Agricultural Extension Agents	VI	MI	SI	NI
5	Age of Agricultural Science Teachers	VI	MI	SI	NI
6	Age of Agricultural Extension Agents	VI	MI	SI	NI
7	Age of farmers	VI	MI	SI	NI
8	Educational level of Agricultural Science Teachers	VI	MI	SI	NI
9	Educational level Agricultural Extension Agents	VI	MI	SI	NI
10	Educational level of farmers	VI	MI	SI	NI
11	Knowledge of roles to be played by stakeholders	VI	MI	SI	NI
12	Attitude of teachers toward the school-based extension support	VI	MI	SI	NI
13	Attitudes of farmers toward the support system	VI	MI	SI	NI
14	Attitudes of AEAs toward the school-based extension support	VI	MI	SI	NI
15	Cooperation between AEAs and Agric. Science teachers	VI	MI	SI	NI
16	Formal linkage between Extension Department and School	VI	MI	SI	NI
17	Informal linkages between AEA and School	VI	MI	SI	NI
18	Existing interactions between farmers and the school	VI	MI	SI	NI
19	Interactions between farmers and JSS Agric. science teacher	VI	MI	SI	NI
20	Existence of official policy on extension-school linkages	VI	MI	SI	NI
21	Availability of school farm in the JSS	VI	MI	SI	NI
22	Availability of modern agricultural equipment and facilities in the school	VI	MI	SI	NI
23	Distance of school from town/village	VI	MI	SI	NI
24	Distance of school farm from town/village	VI	MI	SI	NI

25	Compatibility of extension programmes to school curricula	VI	MI	SI	NI
26	Existence of Farmer-based Organisations / Farmer groups	VI	MI	SI	NI
27	Students' attitudes	VI	MI	SI	NI
28	Existence of active Agriculture Clubs in the school	VI	MI	SI	NI
29	Adequate funding	VI	MI	SI	NI
30	Adequate supervision	VI	MI	SI	NI

14. Any comments.....

.....

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THANK YOU.

APPENDIX G

SECOND PHASE QUESTIONNAIRE TO HEADMASTERS

AVAILABILITY OF INPUTS AND CONDITIONS

1. District
.....

2.
School.....
.....

3. How would you rank the levels of availability and quality of the following inputs in your school adequately enough to support agricultural technology transfer? (Circle your response, using the scale below)

5 VH = Very High
4 H = High
3 M = Moderate
2 L = Low
1 VL = Very Low

F	FACTOR / INPUT / CONDITION	5	4	3	2	1
1	Motivation of agricultural science teachers	VH	H	M	L	VL
2	Competency of Agricultural Science Teachers	VH	H	M	L	VL
3	Educational level of Agricultural Science Teachers	VH	H	M	L	VL
4	Educational level of farmers	VH	H	M	L	VL
5	Knowledge of roles to be played by stakeholders	VH	H	M	L	VL
6	Attitude of teachers toward the school-based extension support	VH	H	M	L	VL
7	Attitudes of farmers toward programmes in the school	VH	H	M	L	VL
8	Cooperation between AEAs and Agric. Science teachers	VH	H	M	L	VL
9	Size of school of school farm	VH	H	M	L	VL
10	Modern agricultural equipment and facilities in the school	VH	H	M	L	VL
11	Distance of school farm from town/village	VH	H	M	L	VL
12	Existence of Farmer-based Organisations / Farmer groups	VH	H	M	L	VL
13	Existence of active Agriculture Clubs in the school	VH	H	M	L	VL
14	Adequate funding	VH	H	M	L	VL
15	Adequate supervision	VH	H	M	L	VL

4. To what degree do you have a clear knowledge about what role you are

expected to play in the extension support system?

i. Very clear
j. Moderately clear
k. Slightly clear
l. Not clear

5. Which **one** of the following descriptions exactly fits the condition of the school farm in your school? (Please tick ✔)

a. There is no school farm
b. School farm in poor condition
c. School farm is very far away from the school and town
d. There is a good school farm

6. List the following identified institutional challenges in order of reducing importance as they would apply to the use of the school as the base for an extension support system

Linking SBESS to both school curriculum and Farmers' needs	[ ]
Motivating extension workers and teachers	[ ]
Getting farmers to visit the school farms regularly	[ ]
Conflicting demands on the school farm enterprises	[ ]
Networking/cooperation among SBESS actors and centers	[ ]
Developing methods to encourage Student participation.	[ ]
Students motivation	[ ]
Policy barriers	[ ]
Partnership and assistance from NGOs and other organisations	[ ]
Coping with staff turn-over	[ ]
Gender mainstreaming	[ ]

THANK YOU

APPENDIX H

PHASE 1 QUESTIONNAIRE FOR JSS AND SSS AGRICULTURAL SSCIENCE TEACHERS

1. District.....

2. School.....

Please put a tick (√) against your response to the questions.

Sex: 1. Male [ ] 2. Male [ ]

3. Highest level of formal education attained
   6. Middle school/JSS
   7. Senior Secondary
   8. Agricultural college Certificate
   9. Diploma
   10. Degree

4. What is your age category?
   5. 20 – 30 years
   6. 31 – 40 years
   7. 41 – 50 years
   8. Over 50 years

5. For how many years have you worked as a teacher?.....

6. Do you think it is important to find a new way to help the extension agent in your community to serve more farmers?
   1. Very important
   2 Important
   3. Moderately important
   4. Of low importance
   5. Not important

7. How would you rate the prospect for the development of a system based if schools for supporting the extension system in the farming community?
   5. Very High prospect [ ]
   4. High prospect [ ]
   3. Moderate prospect [ ]
   2. Low prospect [ ]
   1. Very Low prospect [ ]

8. Which of the following kinds of personalities would suggest should be active participants in a programme that would be a support system to the

extension agent in your community? (Please tick X in the box)

The local Agricultural Extension Agent	[ ]
District Agricultural Development Officer	[ ]
Farmer	[ ]
JSS Agricultural Science Teacher	[ ]
JSS headmaster/Headmistress	[ ]
Agricultural Science Teacher	[ ]
SSS headmaster/Headmistress	[ ]
Student	[ ]

9. How would you rate your level of motivation to participate in the kind of programme that would be a support system to the extension agent in your community?

5. Very High 4. High 3. Moderate 2. Low 1. Very Low

10. Indicate by choosing the appropriate number, the frequency at which you hold consultations on farming problems with the following personalities

KIND OF PERSONALITY	5. very frequent	4 frequent	2.Occasional	1. Not at all
AEAs				
JSS AGRIC. TEACHERS				
SSS AGRIC TEACHERS				

11. If the Extension officer decides to use the school's facilities and farm for extension demonstrations, what roles do you expect the following people to play?

a. Yourself
.....

b. The Agric. Extension Agent
.....

c. The School headmaster/headmistress
.....

d. The farmer
.....

e. The Student
.....

12. List four important requirements that you think must be available in the school and community before the extension agent can use the school as a base for

teaching new technologies to farmers.

.....

.....

.....

.....

13. How important do you perceive each of the following factors to be in the prospect for the school-based extension support system? Please use the scale below and circle your response:

VI = Very important
MI = Moderately important
SI = Slightly important
NI = Not important

F	FACTOR / INPUT / CONDITION	Perceived Importance			
1	Motivation of agricultural science teachers	VI	MI	SI	NI
2	Motivation of AEAs	VI	MI	SI	NI
3	Competency of Agricultural Science Teachers	VI	MI	SI	NI
4	Competency of Agricultural Extension Agents	VI	MI	SI	NI
5	Age of Agricultural Science Teachers	VI	MI	SI	NI
6	Age of Agricultural Extension Agents	VI	MI	SI	NI
7	Age of farmers	VI	MI	SI	NI
8	Educational level of Agricultural Science Teachers	VI	MI	SI	NI
9	Educational level Agricultural Extension Agents	VI	MI	SI	NI
10	Educational level of farmers	VI	MI	SI	NI
11	Knowledge of roles to be played by stakeholders	VI	MI	SI	NI
12	Attitude of teachers toward the school-based extension support	VI	MI	SI	NI
13	Attitudes of farmers toward the support system	VI	MI	SI	NI
14	Attitudes of AEAs toward the school-based extension support	VI	MI	SI	NI
15	Cooperation between AEAs and Agric. Science teachers	VI	MI	SI	NI
16	Formal linkage between Extension Department and School	VI	MI	SI	NI
17	Informal linkages between AEA and School	VI	MI	SI	NI
18	Existing interactions between farmers and the school	VI	MI	SI	NI
19	Interactions between farmers and JSS Agric. science teacher	VI	MI	SI	NI
20	Existence of official policy on extension-school linkages	VI	MI	SI	NI
21	Availability of school farm in the JSS	VI	MI	SI	NI
22	Availability of modern agricultural equipment and facilities in the school	VI	MI	SI	NI

23	Distance of school from town/village	VI	MI	SI	NI
24	Distance of school farm from town/village	VI	MI	SI	NI
25	Compatibility of extension programmes to school curricula	VI	MI	SI	NI
26	Existence of Farmer-based Organisations / Farmer groups	VI	MI	SI	NI
27	Students' attitudes	VI	MI	SI	NI
28	Existence of active Agriculture Clubs in the school	VI	MI	SI	NI
29	Adequate funding	VI	MI	SI	NI
30	Adequate supervision	VI	MI	SI	NI

14. Any comments.....
.....
.....

THANK YOU.

APPENDIX I

SECOND PHASE QUESTIONNAIRE TO HEADMASTERS

1. District .....

2. School.....

3. How would you rank the levels of **availability** and **quality** of the following inputs in your school adequately enough to support agricultural technology transfer? (Circle your response, using the scale below)

5 VH = Very High
4 H = High
3 M = Moderate
2 L = Low
1 VL = Very Low

F	FACTOR / INPUT / CONDITION	5	4	3	2	1
1	Motivation of agricultural science teachers	VH	H	M	L	VL
2	Competency of Agricultural Science Teachers	VH	H	M	L	VL
3	Educational level of Agricultural Science Teachers	VH	H	M	L	VL
4	Educational level Agricultural Extension Agents	VH	H	M	L	VL
5	Educational level of farmers	VH	H	M	L	VL
6	Knowledge of roles to be played by stakeholders	VH	H	M	L	VL
7	Attitude of teachers toward extension support programmes	VH	H	M	L	VL
8	Attitudes of farmers toward programmes associated with the school	VH	H	M	L	VL
9	Attitudes of AEAs toward the school-based programmes	VH	H	M	L	VL
10	Cooperation between AEAs and Agric. Science teachers	VH	H	M	L	VL
11	Strength of official policy on extension-school linkages	VH	H	M	L	VL
12	Size of school of school farm	VH	H	M	L	VL
13	Modern agricultural equipment and facilities in the school	VH	H	M	L	VL
14	Distance of school farm from town/village	VH	H	M	L	VL
15	Existence of Farmer-based Organisations / Farmer groups	VH	H	M	L	VL
16	Existence of active Agriculture Clubs in the school	VH	H	M	L	VL
17	Adequacy of funding	VH	H	M	L	VL
18	Adequacy of supervision	VH	H	M	L	VL

4. How would you rate the presence of the following requirements in the JSS and SSS in your school for an extension support programme?

Schools have basic agricultural facilities (School farms, apiary, , tools, farm assistants.)	VH	H	M	L	VL
At least a day is allocated for practical fieldwork, and for farmers' visits.	VH	H	M	L	VL
Students trained to receive and direct visiting farmers to SBESS .	VH	H	M	L	VL
Other members of staff are part of SBESS	VH	H	M	L	VL
Schools have active students' agricultural clubs	VH	H	M	L	VL
Presence of farmers groups in the community					

5. To what degree do you have a clear knowledge about what role you are expected to play in the extension support system?

4 Very clear
3 Moderately clear
2. Slightly clear
1. Not clear

6. Which **one** of the following descriptions exactly fits the condition of the school farm in your school? (Please tick ✔)

a. There is no school farm
b. School farm in poor condition
c. School farm is very far away from the school and town
d. There is a good school farm

7. Rank the following motivating factors in order of reducing importance (most important first) how they influence you to participate in extension activities.

Improved income [ ]
Sympathy to other people's problems. [ ]
Work made easier [ ]
Interesting work [ ]
Appreciation by beneficiaries of work done in [ ]
Survival in occupation [ ]
Promotions and occupational growth [ ]
Good working conditions [ ]
Self-fulfilment [ ]
Personal loyalty to Stakeholders [ ]

8. List the following identified institutional challenges in order of reducing importance as they would apply to the use of the school as the base for an extension support system

Linking SBESS to both school curriculum and Farmers' needs [ ]
Motivating extension workers and teachers [ ]
Getting farmers to visit the school farms regularly [ ]

Conflicting demands on the school farm enterprises [ ]
Networking/cooperation among SBESS actors and centers [ ]
Developing methods to encourage Student participation. [ ]
Students motivation [ ]
Policy barriers [ ]
Partnership and assistance from NGOs and other organisations [ ]
Coping with staff turn-over [ ]

9. Any comments or suggestions.....
.....
THANK YOU

APPENDIX J

MAP OF CENTRAL REGION SHOWING THE STUDY AREA