

UNIVERSITY OF CAPE COAST

STUDENTS' AND TEACHERS' PERCEPTIONS OF SCHOOL FARM
INTERVENTIONS BY THE DEVELOPMENT ASSISTANCE TO SCHOOL
FARMS (DASFA) IN THE CENTRAL REGION, GHANA.

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BY

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SEPTEMBER, 2007

DECLARATION

Candidate's Declaration

I hereby declare that this dissertation 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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Supervisor's Declaration

I hereby declare that the preparation and presentation of the dissertation were supervised in accordance with the guidelines on supervision of dissertation laid down by the University of Cape Coast.

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ABSTRACT

This study examined the perceptions of teachers and students of school farm interventions by an agricultural education NGO known as Development Assistance to School Farms (DASFA). The population for the study was students and teachers who have participated in school farm activities supported by DASFA. Students of the Agro-Youth Clubs at Cape Coast School for the Deaf and Jukwa Senior Secondary School and their teachers, patrons, and farm assistants were purposively sampled because of their participation in all four of the agricultural enterprises examined.

A descriptive survey design employing the Retrospective Pre-post Approach was used to examine competency perceptions of the students before and after the school farms and gardens project interventions. Teachers were surveyed through the use of questionnaires. Means and standard deviations were computed to describe students' perceived competency levels. Paired t-tests were computed to determine whether there were significant differences between perceived levels before and after the project interventions.

The findings of the study indicated that significant gains were made in terms of students' acquisition of knowledge and skills in the four enterprises included in the study. Teachers indicated that the interventions were helpful in contributing to the delivery of the agriculture curriculum in their schools. Some problems reported include insufficient inputs and lack of incentives. Recommendations for improving the management of school farms included wider involvement and commitment, transparent record-keeping and the sharing of profits.

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Much appreciation is rendered to the lecturers at IEPA for spurring us on to bear good fruit on the educational landscape.

DEDICATION

To my loving husband and wonderful children
for their support and encouragement.

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CHAPTER ONE

INTRODUCTION

Background to the Study

Agriculture is a dominant sector in the Ghanaian economy in terms of its share of GDP, foreign exchange earnings and employment. According to the Institute of Statistical, Social and Economic Research (ISSER) (2001) it provides livelihood for over 70% of the population and accounts for 40.5% of the Gross Domestic Product (GDP) and accounts for 38.6% of the country's foreign exchange earnings.

The importance of agriculture is reflected in the educational policies of the country. Since 1987, Ghana's educational policies have had agriculture as an integral part of the curriculum from basic to tertiary levels of the education system. Currently, Agriculture is taught as part of Environmental Studies in Primary grades 1-3. The subject is taught as part of Integrated Science in Primary grades 4-6 (MOE, 1998). At the Junior Secondary School (JSS) level, Agriculture is a full subject on its own and examinable at the Basic Education Certificate Examination (BECE) (MOE, 2000). Agriculture is also taught at the Secondary School level as part of the Integrated Science Curriculum and as an elective subject. It is also taught in Teacher Training Colleges in Ghana.

The mission statement of the Ministry of Education commits the Ministry to providing:

...relevant education to all Ghanaians at all levels to enable them to acquire skills that will assist them to develop their potential, to be productive, to facilitate poverty reduction and to promote socio-economic growth and national development (Government of Ghana, 2003, p. 6).

In fulfilment of this mission, the Ministry of Education also commits itself in the first of the goals for the Education Sector to providing “facilities to ensure that all citizens...are functionally literate and self reliant” (p. 6). In an agricultural society one would expect these facilities to include viable school farms for the teaching of agriculture in order to fulfil the goal of providing the intended relevant education that would ensure the desired productivity and self reliance of its citizens.

The teaching syllabuses for Senior Secondary School (SSS) and Junior Secondary School (JSS) Agriculture require that for the effective teaching and learning of Agriculture school farms should be kept for growing crops and rearing of farm animals (MOE, 2003). This is essential for satisfying the general aim of helping students to “acquire skills for productive and sustainable agriculture” (p. iii).

A variety of teaching methods including demonstrations, supervised practice, project work and laboratory work is suggested for the appropriate teaching of the subject at the JSS (MOE, 2000). The syllabus suggests that each school keeps a farm or adopts a farm. It is recommended that where this is not possible at least a plot of about 10 metres by 10 metres per class can be used for

growing crops. It is stated that even the simplest containers such as seed boxes, pots and tins could be used to encourage the study of the practical aspects of the subject (MOE, 2000).

Although the syllabuses have suggested practical teaching approaches and recommended agriculture production units as facilities for implementing the programme, inadequate funding, weak teacher competence, attitudes, non availability of tools and equipment and stray animals have led to the use of reading as the main methodology of teaching (Kontoh, 2003) and (CRDD, 1994).

To offset the problems militating against the establishment of school farms and gardens for the practical teaching of agriculture some agricultural education stakeholders including NGOs contribute support for the establishment of viable school farms. One of such NGOs operating in the Central Region is Development Assistance to School Farms (DASFA). DASFA is a not-for-profit, agricultural education non-governmental organization (NGO) that promotes the teaching and learning of agriculture as a practical subject in schools. DASFA facilitates the establishment of school farms and gardens to achieve this aim. DASFA also facilitates the formation of agricultural clubs—Agro-Youth Clubs—in schools to encourage a positive attitude towards agriculture among the youth and to promote agriculture as an exciting and profitable venture that contributes to sustainable livelihoods and fosters poverty reduction.

The learning activities of school agricultural clubs are supported by a team of volunteers who are mostly teachers of agriculture and agricultural extension agents. Several enterprises such as the production of various vegetables and the

rearing of some livestock are actively undertaken in the school farms by students, teachers, farm assistants and extension agents working and learning together. Sustainable and environmentally sound procedures are integral parts of all agricultural activities promoted by DASFA. Students keep records as part of their activities and share in the benefits of their labour as part of a “Learn and Earn” concept promoted by DASFA.

Statement of the Problem

The SSS and JSS agriculture syllabuses require schools to have a school farm or garden for the effective delivery of the curriculum. Due mainly to financial constraints many schools are unable to maintain school farms and gardens. Some non-governmental organizations (NGO's) are involved in offering assistance to schools for the establishment of school farms for the effective teaching and learning of agriculture as a practical subject. The perceived effects by students and teachers of these interventions have not been systematically studied and are, therefore, largely unknown or undocumented. The problem therefore was to examine, from students' and teachers' perspectives, the extent to which DASFA support for the development of school farms is affecting the acquisition of knowledge and skills and the shaping of students' attitudes in agriculture. This study was a case study of the interventions by DASFA at Cape Coast School for the Deaf and Jukwa Senior Secondary School.

Purpose of the Study

The purpose of this study was to find out students' and teachers' perceptions of school farm interventions by the agricultural education NGO,

Development Assistance to School Farms (DASFA). The study sought to determine perceived levels of knowledge and skills gained. It also set out to determine what teachers' perceptions were of DASFA's in-school agricultural project interventions in terms of contribution to the implementation of the agricultural curriculum in their schools and difficulties faced by students and teachers in implementing in-school agricultural projects.

Research Questions

In order to determine the effectiveness of school farm project interventions carried out by DASFA at Cape Coast School for the Deaf and Jukwa Secondary School the following research questions were used:

1. What are students' perceptions of DASFA's in-school agricultural project interventions in terms of acquisition of knowledge and skills?
2. What are teachers' perceptions of DASFA's in-school agricultural project interventions in terms of contribution to the implementation of the agricultural curriculum in their schools?
3. What are the difficulties faced by students and teachers in implementing in-school agricultural projects?
4. How should school farm projects be managed by school authorities to ensure sustainability of in-school farm and garden projects?
5. What improvements for school farm and garden projects are recommended by students and teachers?

Significance of the Study

A large percentage of Ghana's citizens earn their livelihoods from agriculture. This makes agricultural education an important component of the national education system. Agricultural education has an important role to play in the socio-economic development and poverty reduction efforts through the development of human manpower resources. As a practical subject, the needed inputs must be employed to make hands-on, project-based learning effective. Stakeholder participation is important because the Government of Ghana alone cannot be saddled with the provision of quality agricultural education nationwide as inputs required for setting up school farms and gardens are expensive. Among the stakeholders contributing to agricultural education in Ghanaian schools is the NGO, Development Assistance to School Farms, DASFA.

It is important to evaluate the activities of stakeholders in order to gauge their effectiveness. This study is one such effort and is significant in that the findings will provide useful information for stakeholders such as the GES, the NGO, management of schools, and students and teachers involved in the projects. The findings can guide GES policymakers to shape policy to guide stakeholder, particularly NGO, participation in agricultural education. It will provide the NGO and its donors with useful information about the effectiveness of its programmes and guide the development of future project interventions. It can also provide direction to school management in terms of planning and budgeting to make the best use of limited funds available. Students and teachers who took part in the

projects also stand to benefit from the improvements that may be made in the projects in their schools as a result of this study.

Delimitations

The study was limited to the Central Region where the NGO is most actively involved in assisting schools to develop viable school farms. The two schools: Cape Coast School for the Deaf and Jukwa Secondary School were selected for the study as they were the longest standing beneficiaries of assistance from the NGO and had developed farm enterprises in all four of the enterprises considered in the study.

Limitations

The researcher wished she could have included all the schools served by the NGO in the study. However, time and budgetary constraints made it impractical for them to be involved in this study.

Definition of Terms

“Teachers” as referred to in this study included not only classroom teachers but also head teachers, farm assistants and Agro-youth Club Patrons.

“Project interventions” as used in the text refers to all of the inputs and support provide by the NGO toward the development of school farm enterprises.

Organization of the Study

The study is organized under five chapters. The first chapter deals with the introduction and covers the background of the study the statement of the problem, the research questions, significance of the study, delimitations and definition of terms. Chapter two reviews literature and the relevant variables of

**the study while chapter three presents details of the methodology for the
conduction of research. The findings and discussion of the results are presented
in chapter four while the summary, conclusion and recommendations are
presented in chapter five.**

CHAPTER TWO

LITERATURE REVIEW

For this study which looks at the perceived effectiveness of school farm project interventions by the NGO, DASFA the following areas are included in the review of literature: Education and Development, Experiential Learning, School Gardens/Farms in Agricultural Education, Agriculture in the School Curriculum, The Present Lack of Practical Teaching of Agriculture, Non-Governmental Organizations and Agricultural Development, Evaluation of Project Activities, and Assessment of Participant Perceptions.

Education and Development

Education and training are powerful weapons in the fight against rural poverty. Providing quality education that will contribute meaningfully to development requires well-planned, deliberate strategies in order to achieve success.

The need to provide beneficial or relevant education in order to accomplish development goals has been addressed by several educationists. According to Freire (cited in Gerhardt, 2005), for education to be successful it should be transformational and liberational. As such, it should make noticeable and desirable changes in the circumstances of its beneficiaries and thus, inspire hope.

Education, therefore, should be suited to the needs of the society that it serves. Coombs (1970) asserts that:

...educational planning should be integrated with the plans of broader economic and social development. If education is to contribute most effectively to individual and national development and to make the best use of scarce resources, it cannot go its own way, ignoring the realities of the world around it (p. 33).

He also asserts that we should be careful not to provide the “wrong sort of education” for the world of work in which we live (p. 30). Coombs proposes that we consider providing education that would condition people for leadership in rural and agricultural development. He asserts that this sort of training is “indispensable to over-all national development” (p. 30).

Antwi (1992) suggests that we should aspire to provide:

an ideal type of education to prepare Ghanaians of all ages for the social and technological world of the twenty-first century and provision for schools in which a vast proportion of people who are not destined for academic careers would be assured of acceptance, opportunity and success (p. 265).

In this way, the right type of education suited to the needs of a developing society would be provided. He proposes that appropriate skills for development should permeate the entire school curriculum.

Harbison (1973) sounds a warning and puts forth some thought provoking choices for us:

Education can be either a constructive or a destructive force. It can develop people whose skills are strategic or useless for economic growth; it can help select persons for leadership roles who may promote progress or impose stagnation; it can favour the rich and discriminate against the poor; it can build a work-oriented or leisure-oriented mentality; it can free the mind or strangle it with indoctrination; it can energize people or it can destroy their initiative. Conceivably, it could even be irrelevant in shaping today's societies (p. 54).

In the recent White Paper on the Report of the Education Reform Review Committee (Republic of Ghana, 2004), the President reaffirms the nation's aim of "making education more relevant to the world of work after school, to rural development and modernization of the predominantly agriculture-based economy" (p. 4).

Experiential Learning

Experiential education as described by the American Association for Experiential Education is "a process through which a learner constructs knowledge, skill and value from direct experiences" (cited in Taylor 2003, p. 209). School farms and gardens provide opportunities for experiential learning. Gardens are used as teaching tools where pupils can put into practice what they have learned. They serve as means of teaching and learning about farming techniques and of introducing new and improved technologies. The importance

and benefits of experiential or hands-on learning as relating to the practical teaching and learning of agriculture cannot be overemphasized.

The philosophical roots of practical farm and garden-based instruction can be found in the work of educational theorists such as Comenius, Froebel, Montessori, and Dewey who advocated practical, useful, experience based education. Comenius, as far back as the 17th century, recommended that there should be a garden attached to every school so that students would enjoy the benefits of the perceptions of the senses which were considered even then to be the most trusty servants of the memory leading to permanent retention (Desmond, Griesshop & Subramaniam, 2003).

Froebel (in Desmond et al) stated that surroundings such as gardens and farms provide insight into the character of things and allows them to be studied in their natural connection in a way that builds on what is known, familiar and relevant and stretches toward the unknown. Montessori (1969) indicates that the practical experience acquired in the garden helps children to draw connections between their actions and effects on the world around them and helps them to begin to develop a sense of mission in life.

Dewey (1915) proposed that school farms and gardens provide opportunities for reproducing life situations and for acquiring and applying information and ideas in carrying forward progressive experiences. They also provide a wider social and historical perspective within which to place knowledge of farming and horticulture. It enables the connection, for example, of subjects under “botany” to be considered as part of life intricately connected to subjects in

other fields such as soil science, animal life and human relations. His principles emphasised learning through varied activities. He believed learning could be controlled by controlling the environment in which children think, act and feel. He recommended directing, focussing and ordering of experience that would invite participation in attaining the desired objective. He saw education as a constant process of reorganizing and restructuring of experience. According to Brumbaugh and Lawrence (1963) Dewey insisted that “learning cannot be dissociated from activity” (p. 142).

More recent support for this approach of learning is provided by theories of experiential learning and theories of intelligence. For example, according to Kolb’s Experiential Learning Model (cited in Weatherford and Weatherford, 1987) concrete experience leads to observations and reflections that result in the formation of abstract concepts and generalizations of these concepts as well as the capacity to test the implications of these concepts in new situations. Gardner’s theory of multiple intelligences supports the assertion that just as most children are ready to master language at an early age, so too are they predisposed to explore the world of nature (Gardner, 1999).

Interest in experiential education and project-based learning (PBL) is on the increase as educators recognize the value of hands-on learning. For example, DeMarco, Relf and McDaniel (1998) noted that elementary school teachers could use the process of growing plants and gardening as a vehicle to present an interdisciplinary curriculum to their students. Projects around the world have demonstrated the value of hands-on learning. Studies by The Centre for Urban

Environment in Sweden (MOVIUM) of models such as the Coombs Infant and Nursery School in Great Britain and studies of the pre-schools of Reggio Emilia, Italy have demonstrated the unique contributions to be made by project-based learning (Desmond, Grieshop & Subramaniam, 2003). Efforts to provide youth in school with knowledge and practical skills that are closely linked with realities in the farming occupation were concentrated on in attempts to raise agricultural production in Zimbabwe (Chung,1991). Garden-based learning has, indeed, gained popularity across the international agricultural landscape and has been recognized as contributing to the retention of learned material, empowerment, academics and teamwork.

School Gardens/Farms in Agricultural Education

For developing nations such as Ghana, agricultural education is an essential component of general education for development. Agriculture is a dominant sector in the Ghanaian economy in terms of its share of GDP, foreign exchange earnings and employment. According to ISSER (2001) it provides livelihood for over 70% of the population, accounts for 40.5% of the Gross Domestic Product (GDP) and accounts for 38.6% of the country's foreign exchange earnings.

Agricultural education may be defined as education in agriculture that provides knowledge, skills and brings about the development of competencies and attitudes to enable the learner master what is to be learned. As a practical subject, the important role of school farms and gardens in the delivery of agricultural education at the basic, secondary and tertiary levels cannot be overemphasized.

School farms and gardens; both urban and rural can have several interrelated objectives. The Food and Agricultural Organisation of the United Nations (FAO, 2004, Sept.) classifies school gardens as having either “educational” or “economic/food security” purposes. The following educational aims of school gardens are suggested:

1. Increasing the relevance and quality of education for rural and urban children by introducing into the curricula important skills
2. Teaching students how to establish and maintain home gardens and encourage the production and consumption of micronutrient-rich fruits and green leafy vegetables
3. Providing active learning by linking gardens with other subjects, such as mathematics, biology, reading and writing
4. Contributing to increasing access to education by attracting children and their families to a school that addresses topics relevant to their lives
5. Improving children’s attitudes towards agriculture and rural life
6. Teaching environmental issues, including how to grow safe food without using pesticides
7. Teaching practical nutrition education in order to promote healthy diets and lifestyles
8. Providing students with a tool for survival at times of food shortages.

In addition to the educational aims listed above, the following economic and food security aims of agricultural education include:

- i. Familiarizing school children with methods of sustainable production of food that are applicable to their homestead or farms and important for household food security
- ii. Promoting income-generation opportunities
- iii. Improving food availability and diversity
- iv. Enhancing the nutritional quality of school meals
- v. Reducing the incidence of malnourished children attending school.

Thus while the objectives of school farms and gardens are many and varied they aim to increase the relevance and quality of education through active learning.

Agriculture in the School Curriculum

The importance of agriculture is reflected in the educational policies of the country. Since 1987, Ghana's educational policies have had agriculture as an integral part of the curriculum from Basic to Tertiary levels of the education system.

The goals of making education useful and relevant are embodied in the Mission Statement of the Ministry of Education which commits the Ministry to providing "relevant education to all Ghanaians at all levels to enable them to acquire skills that will assist them to develop their potential, to be productive, to facilitate poverty reduction and to promote socio-economic growth and national development." (Government of Ghana, 2003, p. 6). In order to fulfil this mission, the Ministry of Education commits itself to providing facilities to ensure that all citizens are functionally literate and self reliant. In an agricultural society

one would expect these facilities to include viable school farms for the teaching of agriculture in order to fulfil the goal of providing relevant education that would ensure the productivity and self reliance of its citizens.

Currently, agriculture is taught as part of Environmental Studies in Primary grades 1-3. The subject is taught as part of Integrated Science in Primary grades 4-6, (MOE, 1998). At the Junior Secondary school level, agriculture is a full subject on its own and examinable at the Basic Education Certificate Examination (BECE) (MOE, 2000). Agriculture is also taught at the Secondary School level as part of the Integrated Science Curriculum and as an elective. It is also taught in Teacher Training Colleges in Ghana.

School farms are, in fact, required at the JSS and SSS levels. The teaching syllabuses for Senior Secondary School and Junior Secondary School Agriculture recommend that for the effective teaching and learning of agriculture school farms should be kept for growing crops and rearing of farm animals. This is essential for satisfying the general aim of helping students to “acquire skills for productive and sustainable agriculture” (MOE, 2003, Sept., p. iii).

The JSS syllabus suggests that where it is not possible to keep or adopt a farm at least a plot of about 10 metres by 10 metres per class can be used for growing crops. It also suggests that containers could be used for growing crops. The simplest containers like seed boxes, pots and tins could be used to encourage the study of the practical aspects of the subject (MOE, 2001).

A variety of teaching methods including demonstrations, supervised practice, project work and laboratory work is suggested for the appropriate

teaching of the subject at the JSS (MOE, 2000). At the JSS level agriculture education is guided by a comprehensive curriculum embodied in the JSS Syllabus. The Ministry of Education (2000, Sept.) specifies the following as the general aims of the Junior Secondary School (JSS) agriculture syllabus:

1. Appreciate the role that agriculture plays in the socio-economic life of Ghana
2. Acquire fundamental skills in modern farming
3. Adopt scientific farming procedures
4. Acquire basic skills in secondary agriculture production involving food processing and marketing
5. Acquire entrepreneurial skills in agricultural production
6. Appreciate the importance of further education in agriculture.

All of the above aims require that agriculture is taught practically, through hands-on learning techniques now popularly known as Practice Oriented Education (P.O.E) which provides opportunity for experiential learning. School farms and gardens should provide opportunities for experiential learning. Gardens are used as teaching tools where pupils can put into practice what they have learned. They serve as means of teaching and learning about farming techniques and of introducing new and improved technologies.

The Present Lack of Practical Teaching of Agriculture

Indications are that the practical component of agricultural science teaching is being overlooked. Mensah (2005) reported that over 38 percent of

Junior Secondary Schools did not have any school farms or gardens. He also noted that 71 percent of school farms he surveyed in the Central Region of Ghana were in poor condition. He concluded that this was an indication that the practical component of JSS agricultural science teaching has been overlooked or inadequately tackled.

Unfortunately, agriculture is largely being taught as a theory subject. Reading has become the main methodology of teaching agriculture despite the fact that the syllabuses require practical teaching approaches and recommend agriculture production units as facilities for implementing the programme (Kontoh, 2003 and CRDD, 1994). Ashiagbor (in CRDD, 2003, Oct.) ascribes this present state of affairs to inadequate funding and facilities (agriculture production units) in both public and private sectors and also indicates that agriculture production units have not been adequately provided for teaching the subject with hands-on experience. Thus, the major methodology employed is textbook reading.

This should not be the case as it is inconsistent with the tested positions of educational philosophers such as Dewey and Freire. Just how the art, science and business of growing food and rearing animals can be taught only theoretically beats the imagination. Attention must be given to the role of school farms and gardens in the delivery of agricultural education as a practical subject, at the basic, secondary and tertiary levels.

A report by the CRDD (1994) identified the following factors as contributing to the unfortunate situation of teaching agriculture primarily through reading methodology:

1. Inadequate funding to develop agriculture production units
2. Poor attitudes toward the subject
3. Non-availability of tools/ equipment
4. Weak teacher competence and
5. Stray animals that destroy farms and gardens and discourage efforts of teachers and students.

Some additional likely causes for agriculture being taught primarily through reading methodology may include:

- i. Failure of administration to implement stated policy which is directly related to the problem of lack of funding and poor attitudes toward the subject.
- ii. Low teacher and student motivation
- iii. Lack of experience and vision for developing viable farms and gardens
- iv. Lack of land for farms or gardens
- v. Overcrowded syllabus & poor timetabling
- vi. Day schools
- vii. The subject is not seriously examined as a practical subject

In order to remedy the present situation, all of the above factors must be carefully considered. Sound planning efforts should include examining and tackling all of the above components as they relate to the establishment of school farms. A more systematic approach to the problem may then be adopted to develop plans and strategies aimed at ensuring full implementation of the agriculture curriculum.

Non-Governmental Organizations and Agricultural Development

A non-governmental organization (NGO) is an organization that is not part of a government and was not founded by a state. They are usually non-profit organizations that rely on various sources for funding to enable them to undertake activities to accomplish their stated objectives. The major role of NGOs in sustainable development has been recognized by the United Nations. The World Bank classifies NGOs as either Operational NGOs or Advocacy NGOs.

Operational NGOs are those whose primary purpose is to design and implement development-related projects. They may be sub-divided into relief-oriented or development-oriented organizations; they can also be classified according to whether they stress service delivery or participation; or whether they are religious or secular; and whether they are more public or private-oriented. Operational NGOs can be community-based, national or international. Advocacy NGOs, on the other hand, have the primary purpose to defend or promote a specific cause. Their activities tend to centre on raising awareness, lobbying and engaging in other activist events.

NGOs exist for a variety of purposes, usually to further the political or social goals of their members. Examples include improving the state of the natural environment, encouraging the observance of human rights, improving the welfare of the disadvantaged, and supporting agricultural development through agricultural projects.

Kwarteng and Goodchild (2002) define agricultural development as the process of improving agriculture by providing good agricultural policies, good

infrastructure (e.g. roads and electricity), trained human resources (e.g. educated farmers, researchers and extension workers), credit, appropriate agricultural technologies, water, land and good markets to support the growth of agriculture (p. 3). The development of agriculture is expensive and usually government alone cannot bear all the cost. A lot of support is therefore provided by agricultural NGOs whose work compliments governments' efforts. Some important NGOs working to develop agriculture in Ghana include Action Aid, Adventist Relief Agency (ADRA), Sasakawa Africa Association (SAA) and World Vision International (WVI).

Davies (2000) has observed that over the last decade there has been a dramatic growth in the number of NGOs involved in development aid, in both developed and developing countries and that associated with this growth has been a growing concern about identifying the achievements of these NGOs. Howes (1992) has observed that NGOs have, overall, become much more aware of the need for evaluation, compared to the 1980s when there was some outright hostility. Riddell, Kruse, Kyollen, Ojanpera & Vielajus (1997) concluded after looking at evidence from over 60 separate reports of 240 projects undertaken in 26 developing countries that there was still a lack of reliable evidence on the impact of NGO development projects and programmes.

Another problem identified with NGOs is the absence of adequate baseline information (Mansfield, 1996; Riddell et al, 1997). Riddell et al,(1997) and Roche (1999) have observed that NGOs have some sort of monitoring system for

monitoring expenditure as well as activities and outputs, but not effects and impacts.

NGOs are also active in the Central Region of Ghana. Those involved in agriculture include ADRA, World Vision and Development Assistance to School Farms (DASFA). The stated objectives of DASFA are to:

1. facilitate the development of viable school farms to promote the effective teaching and learning of agriculture as a practical subject.
2. train farm managers, farm assistants and teachers of agriculture in the management of school farms.
3. support the revision of agricultural curricula to make them more responsive to current and future challenges in the agricultural sector.
4. promote as well as develop agricultural training materials for agricultural education and training in the formal and non-formal education system.
5. assist women, youth and persons with disabilities in selected agricultural endeavors in and out of school.
6. facilitate agricultural conferences/workshops/seminars that impact on agricultural development including agricultural education and training.
7. provide backstopping for agricultural development programs in schools and in out-of-school situations that impact on schools.
8. foster effective linkages with ministries, departments, agencies (MDA's) and Non-Governmental Organizations (NGO's) for the development of agricultural education.

9. offer students opportunities to develop leadership skills and build good character and lasting national and international friendships through their participation in the activities of school agricultural clubs—Agro-Youth Clubs.

Evaluation of Project Activities

Wentling (1980) asserts that evaluation involves the collection of information and judgements in order to facilitate planning which aids the improvement of programmes and helps to meet accountability demands. Scriven (cited in Stake, 1967) summarises the goals of evaluation as simply determining the merit or worth of whatever is being evaluated.

Evaluations are carried out for a variety of reasons. Education and training programmes are evaluated in order to determine their quality and gain direction for improving them. Adams and Craig (1983) give credence to the notion that the goal of most evaluations is to provide useful feedback to stakeholders of projects. Their findings indicate nearly 90% of teacher education institutions in the United States collect programme evaluation data for the purpose of accountability.

Stufflebeam & Shinkfield (1985) classify the purposes of evaluation as enlightenment, improvement, and accountability. Evaluation for the purposes of enlightenment and improvement provides information to be used in the context of research for promoting increased understanding or for assessing the quality of a service. Evaluation for accountability, on the other hand, provides clientele with summative reports on the results of completed or established programmes or

projects. Summative evaluation as explained by McCaslin (1990) is an assessment conducted at the end of a course or programme to provide evidence of its worth or merit. These summative reports, according to DeRoche (1987) are useful in determining the effects of a programme, project or procedure and will lead to one of three decisions: a) to continue it; b) to change it; or c) cancel it.

In contrast to the purposes of summative evaluation, DeRoche asserts that formative evaluation refers to on-going evaluation during the process of doing something. It involves gathering and using information which provides feed-back and guides decision making and the process of change.

Wentling (1980) asserts that evaluation aids in planning and decision making concerning programmes or activities and also helps to improve programmes, upgrade personnel and account for expenditure to determine whether a programme is worth the cost. Brophy, Grotelueshen, and Gooler (cited in Worthen and Saunders, 1987) purport that the major purposes of evaluation are: 1) To aid in planning procedures, programmes or products; 2) To improve existing procedures, programmes or products; 3) To justify existing or planned procedures, programmes or products.

Anderson and Ball (1978) describe the capabilities of evaluation as applied to formal programmes in terms of six major purposes: 1) to contribute to decisions about the installation of a programme; 2) to obtain evidence to rally opposition against a programme; 3) to obtain evidence in support of a programme; 4) to contribute to the understanding of basic psychological, social and other processes; 5) to contribute to decisions about continuation, expansion,

or certification of a programme; 6) to contribute to decisions to modify a programme.

The World Bank (1995) advocates an evaluation model that requires both summative and formative evaluation in order to provide information to guide administrators in taking rational decisions about improving implementation of programmes. The model provides information on the following five criteria: 1) Relevance; which verifies whether project objectives match the development policy and needs of the recipient 2) Effectiveness; verifying the relationship between the degree of achievement of purpose and outputs 3) Efficiency; verifying productivity in terms of input and output 4) Impact; verifying the effects of implementing the project, whether positive or negative, intentional or unintentional 5) Sustainability to verify whether the benefits of the project will be sustained for a long period of time after the cooperation ends.

Despite the myriad of purposes for which evaluation is employed, it is clear that its role is paramount to educational management and development.

Assessment of Participant Perceptions

There are many ways in which projects may be evaluated or assessed. One of these is by using a participant evaluation approach such as a participant perception indicator (PPI) assessment tool. The PPI is a tool to help evaluate and assess instructional projects or courses that may have technology components or be technology enabled. PPI focuses on students' perception of not only their knowledge, but also on their experience and confidence with the material.

Perception involves knowledge, insight or intuition. It involves a process of observation, awareness, and understanding. According to Feldman (1990) perception is the sorting out, interrelation, analysis and integration of stimuli from our sensory organs. Workman and Loftus (1992) see perception as a starting point for all other psychological processes as it supplies the input or information needed for learning, remembering, problem-solving, and communicating.

Summary of Literature Review

For education to be relevant and to meet the development needs of the nation which has a large portion of its citizens gaining their livelihood in agriculture, the subject must be taught practically. The benefits of hands-on, experiential learning have been attested to by renowned educationists such as Dewey, Froebel, Montessori and Gardner. In order to achieve the practical aims of school farms and gardens which are educational as well as economic, some obstacles must be overcome; such as the lack of inputs and poor attitudes. Stakeholders in education such as NGOs can contribute to the effectiveness of the delivery of the agricultural curriculum by intervening in the educational system. An example of one such NGO is DASFA which supports the practical teaching and learning of agriculture in schools by facilitating the formation of Agro-Youth clubs and providing inputs and technical assistance for the development of school farm enterprises.

While project evaluations of such interventions are largely undocumented and impact difficult to measure, it is important to ascertain the extent to which

objectives are being met. One way of doing this is through the assessment of the perceptions of project participants.

CHAPTER THREE

METHODOLOGY

This section deals with research design, population, sampling, instrumentation, data collection and data analysis.

Research Design

This study used a Descriptive Survey Design employing the Retrospective Pre-post approach to examine students' perceptions of the impact of DASFA's activities on their competencies in terms of knowledge and skills before and after project activities in the cultivation of vegetables and the raising of rabbits, grasscutters and pigs.

The Retrospective Pre-post research design documents changes in knowledge and behaviour simply and efficiently. According to Rockwell and Kohn (1989), this tool is useful for evaluating the impact of programmes by asking participants to report actual changes in behaviour. It is administered only once; as opposed to the typical pretest-posttest which is administered both before and after an intervention. The Retrospective Pre-post design is intended for use after a programme or intervention for participants to report their perceptions of present behaviours and also to report on their perceptions of earlier behaviours before the programme. Participants are asked to share the knowledge or attitude

before an experience, programme or treatment with respect to what they know after experiencing an intervention or treatment.

According to Linn and Slinde (1977) and Howard (1979) for some self-report evaluations, participants may have acquired knowledge by the end of a programme that would make them more capable of accurately assessing pre-programme knowledge and behaviour. Before the programme or intervention respondents may not have the ability to validly answer particular questions. Problems with the typical approach using pretest-posttest research design to document change in behaviour can be avoided by using the Retrospective Pre-post approach; such as the tendency for respondents to overestimate their level of knowledge on a particular subject when using the traditional pretest-posttest (Pratt, McGuigan, & Katzev, 2000). Rockwell and Kohn (1989) state that:

...in certain types of self-report program evaluation, pretest-posttest comparison results may be an inaccurate assessment of instructional impact because participants may have limited knowledge at the beginning of a program that prevents them from accurately assessing baseline behaviours (p.1).

By their assertion Rockwell and Kohn (1989) believe that by the end of the program, participants may have a new understanding of the program content which may have an impact on the responses on their self-assessment.

Davis (2003) says that the Retrospective Pre-Post methodology allows respondents the opportunity to learn how much they know about a subject before

responding to a questionnaire. It therefore allows respondents to more accurately reflect on the degree of change in knowledge, skills, attitude or behaviour as a result of the programme. According to Rockwell and Kohn (1989), “The retrospective pre-test at the end of the programme is more accurate because it’s answered in the same frame of reference as the post-test” (p. 2). They also attest that, “Using a post-then-pre design to identify self-reported behavioural changes can provide substantial evidence for program impact” (p. 6).

Population

The population for this study are JSS and SSS students and teachers who have participated in school farm teaching and learning project activities supported by the agricultural education NGO, DASFA.

Sampling

The Cape Coast School for the Deaf and the Jukwa Senior Secondary School were purposively sampled because they were schools where DASFA operated and where all four enterprises slated for the study had been introduced. The members of the schools’ Agricultural Science Clubs (Agro-youth clubs) who had actively participated in teaching and learning activities supported by DASFA were purposively sampled as respondents from the Agricultural Science Students and included in the study. There were 28 student respondents from Cape Coast School for the Deaf and 26 from Jukwa Secondary School.

In addition, all teachers in both schools familiar with and who had actively participated in DASFA’s activities were included in the study. This group

of teachers numbering 9 included the respective farm assistants and Head teachers of both schools.

Instrument

Teachers' and students' perceptions of interventions by the NGO, Development Assistance to School Farms (DASFA) were collected by two separate validated questionnaires (See Appendices I and II).

Face and content validity of the questionnaires were ascertained by the researcher and experts (including the supervisor of the thesis) respectively. Face validity is a determination by the researcher that the content of the questionnaire is adequate to accurately measure the domains they intend to measure.(Cozby, 2003). Content validity on the other hand refers to "the extent to which the instrument represents the content of interest" (Ary, Jacobs & Razavieh, 1979, p.197). It is determined by experts in the domain of interest such as supervisors of research.

Students' Questionnaire

The students' questionnaire was designed to collect information on their perceived impact of DASFA's school farm interventions. There were five sections in this questionnaire. The students' questionnaire required students to rate their perceived abilities or competencies on a number of project intervention areas in 4 main areas; vegetable production, grasscutter rearing, rabbit rearing and pigs production. Each section required students to rate their competencies both before and after DASFA's project interventions using a scale of 1 to 5 on a Likert-type scale; where 1=Very Poor, 2=Poor, 3=Fair, 4=Good, 5=Very Good.

Students indicated their perceived competencies before DASFA's interventions by circling the numbers in the column to the left of the list of project interventions which they believed corresponded to their competencies before the intervention (see Appendix I). Their perceived competencies after DASFA's project interventions were recorded in the column to the right of each project intervention area.

Section one of the students questionnaire recorded perceived ability or competency for each of the following project intervention areas in Vegetable Production: nursery bed preparation, nursery practices, vegetable bed preparation, healthy seed selection, transplanting, watering fertilising, weeding, pest control (IPM), harvesting and record keeping.

Section two of the questionnaire covered Grasscutter Rearing and recorded students' perceived levels of knowledge and skills in the following areas: preparation of feed, feeding, giving water, cleaning of housing, health care of animals, handling of animals, breeding (crossing) of animals and record keeping.

Section three on Rabbit Rearing, recorded perceived abilities/competencies in the areas of: preparation of feed, feeding, giving water to animals, cleaning of housing, health-care of animals, breeding (crossing) of animals and record keeping.

Section four which covered Pigs Production, recorded perceived levels of knowledge and skills in: preparation of feed, feeding, giving water to animals,

cleaning of housing, health care of animals, handling of animals, breeding of animals, caring for the young, castration and record keeping.

Section five of the questionnaire requested general information on student background comprising age, gender, school and educational level and also elicited information from students regarding the extent to which they thought DASFA project activities had helped their academic performance. Open-ended questions in this section asked students to describe difficulties faced in carrying out school farm project activities and how they thought school farm project activities could be sustained and improved.

Teachers' Questionnaire

The questionnaire for teachers' perceived impact of DASFA's school farm project intervention consisted of two sections. Section one requested teachers to indicate the extent to which each of the following project items contributed to the implementation of the practical agriculture curriculum in their school: inputs for vegetable production, inputs for grasscutter production, inputs for rabbit production, training support for school farm enterprises, cash support for school farm enterprise and supervision.

Section two of the teachers' questionnaire consisted of open-ended questions asking teachers to describe difficulties faced in carrying out school farm project activities and suggestions as to how school farm project activities could be sustained and improved.

Data Collection

The Retrospective Pre-post Questionnaire was administered to the members of the schools' Agricultural Science Clubs (Agro-youth clubs) who had actively participated in teaching and learning activities supported by DASFA. The questionnaire for teachers was filled out by teachers (made up of agricultural teachers, farm assistants and head teachers) from both schools. The researcher was available to answer questions and clarify any difficulties. Translators were used at Cape Coast School for the Deaf to clarify instructions in sign language. All questionnaires were checked during data collection to make sure they were completely filled out.

Data Analysis

The data was analysed using the Statistical Package for the Social Sciences (SPSS). Means and standard deviations were computed to describe competencies of students on the variables of the study (Perceived levels of competencies in Vegetable Production, Grasscutter Rearing, Rabbit Rearing and Pig Production) before and after participating in teaching and learning activities supported by DASFA on their school farms. Competency gains were obtained by subtracting mean perceived competency ratings before the intervention from mean competency ratings after the school farm project interventions.

Paired t-tests were computed to determine whether there were significant differences between mean competencies of students before and after participating in the learning activities. Paired t-tests have been routinely used in the Retrospective Pre-Post design to test whether competency gains after

interventions are significant (Davis, 2003; Rockwell and Kohn 1989). Open ended questions were summarized and tallied to categorize and rank student responses. Tables were constructed to summarize the data.

CHAPTER FOUR

FINDINGS AND DISCUSSION

This chapter provides a discussion of the findings related to the objectives of the study which sought to determine what the perceptions are of students and teachers of two schools in the Central Region concerning school farm interventions by the NGO, Development Assistance to School Farms (DASFA). The findings are reported in the same order as the research questions numbered one to five in chapter one which sought to determine: students' perceptions of DASFA's project interventions in terms of acquisition of knowledge and skills; teachers' perceptions of DASFA in terms of contribution to the implementation of the agricultural curriculum in their schools; difficulties faced by students and teachers in implementing in-school agricultural projects; how school farm projects should be managed by school authorities to ensure sustainability and what can be done to improve these projects.

Students' Perceptions

This section examines the responses of students as pertains to the first research question of this study. "What are students' perceptions of DASFA's in-school agricultural project interventions in terms of acquisition of knowledge and skills?" Students from the two schools involved in this study indicated their perceived knowledge, competencies and skills on a rating scale of 1 to 5. The same rating scales were used for perceived knowledge and skills before and after project interventions by DASFA. The results are presented for the activities in

four main areas: vegetable production, grasscutter-rearing, rabbit-rearing and production of pigs.

Vegetable Production

The perceived competencies of students from Cape Coast School for the Deaf and Jukwa Secondary School in activities related to vegetable production before and after the project interventions of DASFA and mean gains are presented in Table 1.

An examination of the perceived competencies in vegetable production of students at Cape Coast School for the Deaf before the project interventions of DASFA indicates low perceived competencies and skills in all activities except weeding, harvesting and watering (see Table 1). All activities were given higher competency ratings by the students after DASFA's project interventions.

The highest mean gains in competencies for students of Cape Coast School for the Deaf can be seen in the following activities: nursery bed preparation (2.54), nursery practices (2.25), healthy seed selection (2.25), fertilising (2.22) and integrated pest management (IPM) (2.21). It is interesting to note that these activities indicating the highest gains were also among the activities with the lowest pre-project ratings in terms of knowledge and skills. This is an indication that the project-interventions were perceived by the students to be effective in providing needed knowledge and skills. The only activities where gains were marginal were weeding, harvesting and watering. This observation is not unexpected as many students tend to have some exposure to these activities outside the school system.

Table 1

Students' Perceptions of Competencies in Vegetable Production

Activity	Cape Coast School for the Deaf Competency			Jukwa Sec. Sch. Competency		
	Pre x	Post x	Gain	Pre x	Post x	Gain
Nursery bed preparation	1.32	3.86	2.54*	3.12	4.19	1.07*
Nursery practices	1.79	4.04	2.25*	3.27	4.00	.73*
Vegetable bed preparation	1.82	3.79	1.97*	3.54	4.31	.77*
Healthy seed selection	1.43	3.68	2.25*	2.73	3.92	1.19*
Transplanting	2.61	4.21	1.60*	3.85	4.53	.68*
Watering	3.07	4.36	1.29*	4.23	4.73	.50*
Fertilising	1.41	3.63	2.22*	3.12	3.92	.80*
Weeding	4.00	4.39	.39*	4.15	4.19	.04
Pest Control(IPM)	1.11	3.32	2.21*	2.58	3.73	1.15*
Harvesting	3.68	4.57	.89*	4.00	4.50	.50*
Record keeping	1.29	2.89	1.60*	2.92	3.77	.85*

N (Cape Deaf) = 28; N (Jukwa Secondary Sch.) = 26

*Significant at the .05 level of significance

Pertaining to students at Jukwa Secondary School, the results in Table 1 also indicate increases in their perceived competencies after DASFA's project interventions. The highest reported gains in competencies are in the areas of nursery bed preparation (1.07), healthy seed selection (1.19), pest control (IPM) (1.15) and record keeping (.85). The lowest pre-intervention competency ratings

also occurred in these same areas. This indicates that the interventions were successful in meeting the needs of the students in terms of providing needed knowledge and skills.

Pre-project self-ratings of students of Jukwa Secondary School were highest in the areas of watering, weeding, harvesting and transplanting. The lowest mean gains were also indicated in these activities as follows: watering (.50); harvesting (.50); transplanting (.68), and nursery practices (.73). The gain in weeding is not significant because the students already had fair knowledge of this activity before DASFA's interventions.

Other activities which were rated high before the school farm project interventions were the areas of vegetable bed preparation, nursery practices, nursery bed preparation and fertilising. Because Jukwa Secondary School is situated in an area where farming is a common occupation and students are likely to have had some farming experiences in their backgrounds it is not surprising that students indicated that they had a good amount of knowledge and skills in these activities before the project interventions.

While both schools indicated significant gains in all activities in the area of vegetable production— with the exception of weeding at Jukwa Secondary School—Cape Coast School for the Deaf indicated comparatively higher competency gains than Jukwa Secondary School. The reasons accounting for this may be due to the fact that pre-intervention competency scores were higher for Jukwa Secondary School, thus leaving less room for dramatic increases in competencies. Cape Coast School for the Deaf, on the other hand, indicated

lower perceived pre-intervention ratings allowing for greater opportunities to improve competencies. This could be due to the fact that as a Junior Secondary School, students might not have had as much exposure to agriculture as their Senior Secondary School counterparts.

Although the overall perceived competency gains were higher at Cape Coast School for the Deaf, both schools showed some of their highest gains in the areas of nursery bed preparation, healthy seed selection and pest control. This indicates that the project-interventions were most successful concerning these activities. The lowest gains which were common to both schools were in activities related to weeding, watering and harvesting and transplanting.

The lowest perceived competencies for students of both schools after project interventions were indicated in the areas of pest control and record keeping. This suggests that although gains were made, there could be more attention given especially in these areas in the future.

Grasscutter Rearing

The perceived competencies in grasscutter rearing by students from Cape Coast School for the Deaf and Jukwa Secondary School before and after school farm project interventions by DASFA are shown in Table 2. The table shows that students of Cape School for the Deaf indicated increases in their perceived competencies in all activities related to grasscutter rearing after the school farm project interventions. Mean gains in their perceived competencies and skills in grasscutter rearing showed increases ranging from 1.58 to 2.07. The highest gains

were indicated in feed preparation (2.07), record keeping (1.97), handling of the animals (1.96) and cleaning of animal housing (1.96).

Table 2

Students' Perceptions of Competencies in Grasscutter Rearing

School	Cape Coast School for the Deaf			Jukwa Secondary		
	Pre x	Post x	Gain	Pre x	Post x	Gain
Preparation of feed	1.57	3.64	2.07*	2.35	3.42	1.07*
Feeding of animals	2.29	3.93	1.64*	3.08	3.69	.61*
Giving water to animals	2.82	4.43	1.61*	3.38	3.96	.58*
Cleaning of housing	2.50	4.46	1.96*	3.27	3.92	.65*
Health care of animals	1.79	3.57	1.78*	2.77	3.54	.77*
Handling of animals	1.50	3.46	1.96*	2.73	3.62	.89*
Breeding (crossing)	1.96	3.54	1.58*	2.65	3.50	.85*
Record keeping	1.39	3.36	1.97*	3.08	3.69	.61*

N (Cape Deaf) = 28; N (Jukwa Secondary Sch.) = 26

*Significant at the .05 level of significance

Before the farm project interventions students of Cape Coast School for the Deaf rated themselves as having low competencies in activities related to grasscutter rearing. Their lowest pre-intervention competency ratings were in the areas of record keeping (1.39), handling of the animals (1.50), feed preparation (1.57) and health care of the animals (1.79). Activities such as feeding, giving

water to animals and cleaning of animal housing were rated relatively higher than other activities before the interventions. This could be because these activities are more common and possibly do not vary much from the requirements of a wide range of animals that students could have had previous experiences with. It is interesting to note that these same activities retained the highest perceived competency ratings after the project interventions. This indicates effectiveness of the interventions not only in activities where students perceived their competencies as low, but in activities where they perceived themselves before the interventions as having some amount of knowledge and skills.

At Jukwa Secondary School the competency level of students before the project interventions was moderate. Gains in all activities related to grasscutter rearing were also moderate. The greatest increases in perceived competencies after the project interventions were in the areas of preparation of feed, handling of animals, and breeding. The lowest mean gains in competencies were in activities related to feeding of animals, giving water and in record keeping.

The highest mean gains in competencies and skills for students from both schools were recorded in the area of preparing animal feed. While the perceived competency gains of students from both schools show satisfactory increases in all activities related to grasscutter rearing it would be worthwhile to find out what is lacking in the areas which indicated the lowest perceived competency ratings after DASFA's project interventions. The lowest perceived competencies at Cape Coast School for the Deaf after the project intervention were in the areas of record

keeping (3.36) and handling of animals (3.46). The lowest post-intervention rating given at Jukwa Secondary School was in feed preparation (3.42).

Rabbit Rearing

Perceived competencies in rabbit rearing activities of the students from the two schools involved in this study are shown in Table 3. Mean gains recorded in the table indicate that all activities in rabbit rearing showed significant increases after the school farm project interventions of DASFA.

Students of Cape Coast School for the Deaf indicated mean gains in competencies and skills in rabbit rearing activities ranging from 2.68 to 1.79. The highest gains were in the areas of feed preparation, feeding, giving water, health care and handling of the animals. The activities which show the lowest gains are record keeping and cleaning of animal housing. Cleaning of animal housing had high pre-intervention ratings along with other routine activities such as feeding and giving water to animals because students were familiar with these activities and there were therefore low gains in these areas. Health care, handling and preparation of feed, on the other hand, showed low pre-intervention ratings and subsequently the high gains in these areas can be attributed to increased knowledge and skills as a result of DASFA's project interventions. Record keeping showed the lowest pre-intervention competencies along with competencies in preparation of feed. While feed preparation skills received the highest gains for rabbit rearing activities, record keeping maintained the low competencies and received the lowest mean gain.

Table 3**Students' Perceptions of Competencies in Rabbit Rearing**

Activity	Cape Coast Sch. for the Deaf Competency			Jukwa Sec. Sch. Competency		
	Pre x	Post x	Gain	Pre x	Post x	Gain
Preparation of feed	1.21	3.89	2.68*	2.48	3.24	.76*
Feeding of animals	1.96	4.43	2.47*	3.00	3.36	.36*
Giving water to animals	1.86	4.29	2.43*	3.00	3.36	.36*
Cleaning of housing	2.71	4.57	1.86*	3.42	3.71	.29*
Health care of animals	1.42	3.85	2.43*	2.56	3.28	.72*
Handling of animals	1.57	3.96	2.39*	2.60	3.48	.88*
Breeding (crossing)	1.68	3.68	2.00*	2.48	3.16	.68*
Record keeping	1.21	3.00	1.79*	2.68	3.36	.68*

N (Cape Deaf) = 28; N (Jukwa Secondary Sch.) = 25

*Significant at the .05 level of significance

Students of Jukwa Secondary School reported significant increases in perceived abilities and knowledge in all activities related to rabbit rearing. Their highest competency gains in rabbit rearing activities at Jukwa Secondary School can be seen in the areas of handling and health care of the animals and in the preparation of feed.

A comparison of the mean gains in each school shows that students of Cape Coast School for the Deaf indicated higher competency gains than students from Jukwa Secondary School. This could be partially due to the fact that

students of Jukwa Secondary School might have had some exposure to similar activities in the past and being older and having gone through the JSS curriculum. Thus, it is not unusual that their pre-intervention perceived competency levels were higher.

Pigs Production

All activities related to the production of pigs showed significant increases in both schools after the project interventions of DASFA (see Table 4). As pertains to the table, students of Cape Coast School for the Deaf showed the highest increases in competencies and skills in the areas of feed preparation (2.89), cleaning of housing (2.58) and handling of animals (2.54). While cleaning of housing had relatively high pre-intervention competency ratings, feed preparation and handling were indicated as being low competency areas before the project interventions. Feed preparation, in fact was the activity where students indicated the lowest competencies before the project interventions.

Students of Jukwa Secondary School indicated their highest perceived competency gains to be in castration (1.03) and feed preparation (.81).

Table 4

Students' Perceptions of Competencies in Pigs Production

Activity	Cape Coast Sch. for the Deaf Competency			Jukwa Sec. School Competency		
	Pre x	Post x	Gain	Pre x	Post x	Gain
Preparation of feed	1.18	4.00	2.82*	2.69	3.50	.81*
Feeding of animals	1.93	4.29	2.36*	3.04	3.81	.77*
Giving water to animals	2.00	4.32	2.32*	3.31	3.77	.46*
Cleaning of housing	1.96	4.54	2.58*	3.00	3.69	.69*
Health care of animals	1.44	3.74	2.30*	2.46	3.23	.77*
Handling of animals	1.46	4.00	2.54*	2.81	3.46	.50*
Breeding (crossing)	1.96	4.11	2.15*	2.77	3.54	.77*
Caring for the young	1.46	3.71	2.25*	2.69	3.38	.69*
Castration	1.43	2.64	1.21*	2.35	3.38	1.03*
Record keeping	1.40	3.71	2.31	2.73	3.46	.73*

N (Cape Deaf) = 28; N (Jukwa Secondary Sch.) = 26

*Significant at the .05 level of significance

Overall Mean Perceived Gains

Group means for perceived competencies of students of Cape Coast School for the Deaf in each of the agricultural enterprises included in the study (vegetable production, grasscutter rearing, rabbit production and production of pigs) are summarized in Table 5.

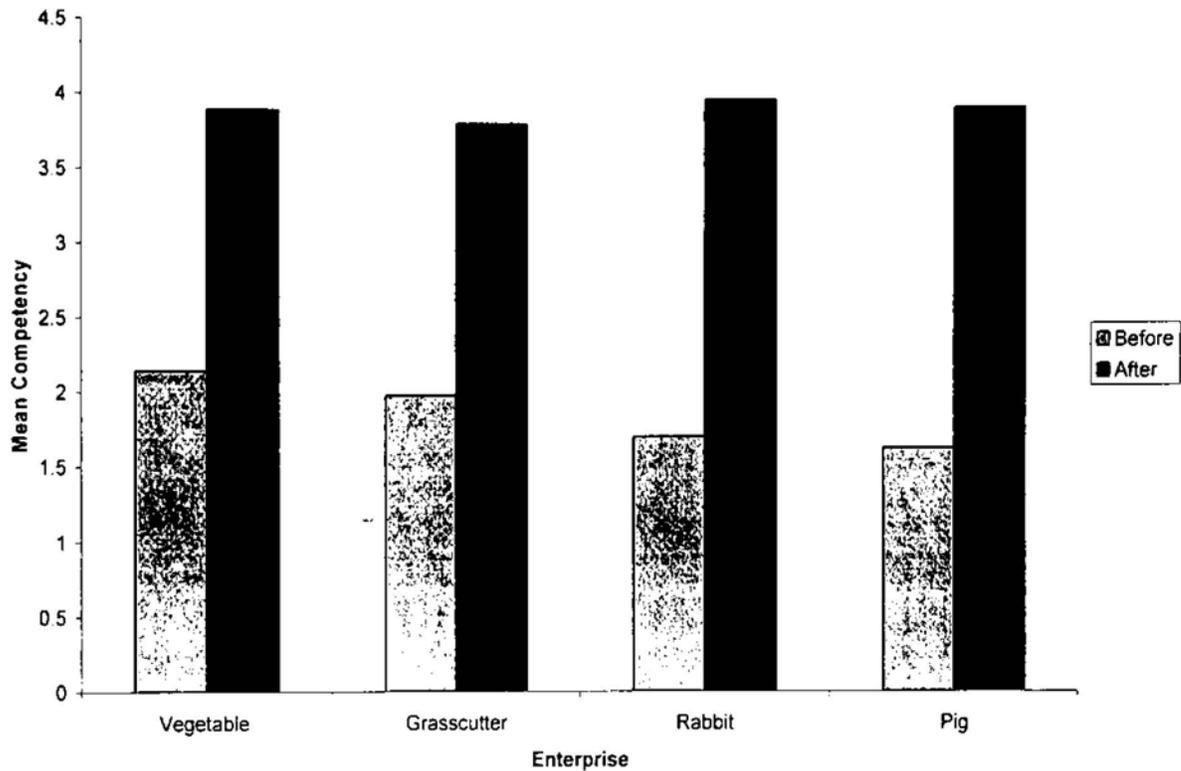
Table 5**Group Means for Perceived Competencies and Skills of Students of Cape Coast School for the Deaf**

Enterprise	Total Mean Perceived Competency				Gain	Ranking
	Pre		Post			
	x	s.d	x	s.d.		
Vegetable Production	2.14	.45	3.89	.56	1.75	4
Grasscutter Rearing	1.98	.70	3.80	.67	1.82	3
Rabbit Rearing	1.70	.70	3.96	.57	2.26	2
Pigs Production	1.63	.67	3.91	.58	2.28	1

It can be seen from the standard deviations in the table that there was not a high degree of variance in the perceptions of the students from Cape Coast School for the Deaf. The standard deviations for perceived gains were under 1.00. Students indicated uniformity in their perceptions of their gains in terms of knowledge and skills.

Ranking of the overall gains for each of the four enterprises examined reveals that the highest gain for Cape Coast School for the Deaf was in the area of production of pigs. It is likely that of the areas examined students were the least familiar with production of pigs before the project interventions. Students may also not have been very familiar with rabbits and activities associated with their production, thus the high reported gain in this area. While students may have been more familiar with grasscutters and showed lower gains in this area than with the pigs and rabbits, they did still show considerable gains in competencies

in activities related to the enterprise. Vegetable production ranked the lowest in terms of overall gains. This is likely due to students being familiar with growing of crops either at home or in school before the interventions of DASFA. These gains can be clearly seen in the bar graph in Figure 1.



Scale: 1=Very Poor, 2=Poor, 3=Fair, 4=Good, 5=Very Good

Figure 1

Mean competencies of students of Cape Coast School for the Deaf in various enterprises before and after DASFA project interventions.

The pre-intervention perceived competency levels of the students of Cape Coast School for the Deaf are indicated by the light coloured bars on the left for

each enterprise. The dark coloured bars on the right indicate the post-intervention perceived competency levels for each enterprise.

The overall perceived competency gains of students of Jukwa Secondary School for the four enterprises examined in this study are summarized in Table 6.

Table 6

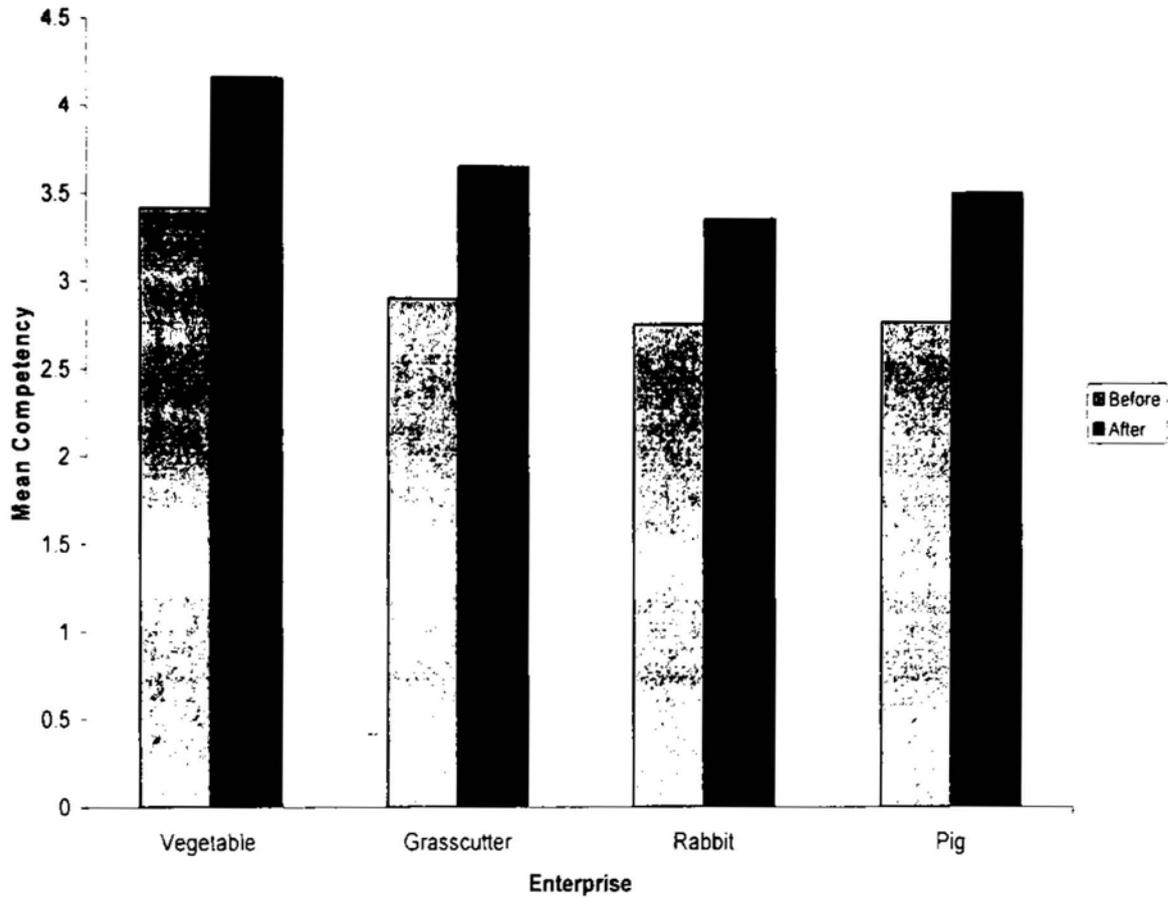
Group Means for Perceived Competencies and Skills of Students of Jukwa Secondary School.

Enterprise	Pre		Total Mean Perceived Competency Post		Gain	Ranking
	x	s.d	x	s.d.		
Vegetable Production	3.42	.63	4.16	.57	.74	2
Grasscutter Rearing	2.91	.84	3.67	.84	.76	1
Rabbit Rearing	2.77	.95	3.38	1.10	.61	4
Pigs Production	2.79	.96	3.52	.91	.73	3

Students from Jukwa Secondary School reported the highest competency gain in the area of grasscutter rearing. Gains in vegetable production ranked second. These were the areas where students indicated the highest levels of knowledge and skills before the project interventions. Production of pigs ranked third. Gains in rabbit rearing were the least of the four enterprises examined.

With the exception of rabbit rearing, all of the mean responses for the various activities in all areas had standard deviations under 1.00. The responses for rabbit rearing indicate that while some students were familiar with the rearing

of rabbits others were not. These gains can be clearly seen in the bar graph in Figure 2.



Scale: 1=Very Poor, 2=Poor, 3=Fair, 4=Good, 5=Very Good

Figure 2

Mean competency ratings of Jukwa students in various enterprises before and after DASFA project interventions.

Perceived competencies of students of Jukwa Secondary School before the school farm project interventions of DASFA are represented by the light coloured

bars on the left of each enterprise and post-intervention competencies are represented by the dark coloured bars on the right.

Competency gains such as these reported by students after project interventions of an NGO are consistent with literature on experiential, hands-on, and project-based learning which is considered highly effective in attaining educational goals (Dewey, 1915; Froebel, 1998; Gardner, 1999; Montessori, 1969). The reported gains are also in concordance with the findings of other studies on experiential education (Desmond, Grieshop & Subramaniam 2003; DeMarco, Relf & McDaniel, 1998).

Perceptions of Teachers

Responses of teachers as pertains to the second research question, “What are teachers’ perceptions of DASFA’s in-school agricultural project interventions in terms of contribution to the implementation of the agricultural curriculum in their schools?” are summarized in Table 7.

Teachers rated the usefulness of inputs on a scale of 1.00 to 4.00 in the areas of: vegetable production, grasscutter rearing, rabbit rearing, pigs production, training, cash support and supervision (See Appendix II). It can be seen from the results in Table 7 that teachers of Cape Coast School for Deaf reported inputs provided by DASFA as being very helpful. Inputs for pigs production were appreciated as the most helpful in terms of assisting them to implement the agricultural curriculum in their school. Teachers from Jukwa Secondary School rated DASFA’s inputs as being moderately helpful in assisting them to attain the

goals of the curriculum. The most helpful input as rated by teachers at Jukwa Secondary School was the inputs for vegetable production.

Table 7

Teachers Perceptions of School Farm Inputs Provided by DASFA

Type of Input	Cape Deaf x	Jukwa Sec. Sch. x
Inputs for vegetable production	3.67	3.33
Inputs for grasscutter rearing	3.67	2.83
Inputs for rabbit rearing	3.67	2.50
Inputs for pigs production	4.00	3.17
Training support	3.33	2.17
Cash support	3.33	2.17
Supervision	3.67	2.67

Inputs for vegetables were rated high in both schools and inputs in terms of cash and training rated lowest. The lower ratings for the helpfulness of cash and training inputs could either be because they are not considered as necessary as other inputs or because there were fewer inputs provided in these areas.

Difficulties Encountered In Implementing In-school Farm Projects

Difficulties faced by students and teachers in implementing in-school agricultural projects are examined in this section. Findings related to research question number three, “What are the difficulties faced by students and teachers in implementing in-school agricultural projects?” are discussed first in terms of

students' responses and secondly in terms of the responses of teachers.

Responses in this section were summarized from open-ended questions on both the Teachers' and the Students' questionnaires.

Difficulties Encountered by Students

Table 8 shows the reported difficulties encountered by students as they carried out project activities on their school farms. The most frequently reported difficulty by students from Cape Coast School for the Deaf was that of dry weather which made it difficult to grow crops during the dry season. The most frequently cited difficulty at Jukwa Secondary School was the lack of tools, equipment and other inputs. Some items mentioned as lacking were: wheelbarrows, watering cans, spades, shovels, hand forks and knapsack sprayers. Students of both schools indicated the poor use of practical periods on their timetable and loss of produce due to thieves as problems. The lack of tools and equipment are indicated in the literature as being obstacles to practical teaching of agriculture (CRDD, 1994).

Table 8**Difficulties Encountered by Students**

Difficulty Encountered	Frequency		
	CapeDeaf	Jukwa	Total
Lack of tools/equipment/inputs	4	19	21
Dry weather/lack of consistent water source	17	3	20
Lack of time/Poor use of practical periods	4	3	7
Thieves	3	3	6
Lack of leadership/supervision	-	5	5
Lack of incentives	-	5	5
Crop pests and diseases	-	3	3
Lack of available market for produce	-	2	2
Poor participation in field activities	-	2	2
Lack of teaching on animals	-	2	2
Hard work	-	2	2
Destruction by goats	-	1	1

Additional difficulties were mentioned by Jukwa Secondary School. These included: the lack of strong leadership and supervision, the lack of incentives given to teachers and students which also agree with previous findings (CRDD,1994; CRDD 2003). They also reported losses due to pests and diseases, lack of available market for the sale of produce, poor participation in field

activities, lack of teaching on animals, the demanding nature of work on farm activities and damage done by stray goats.

Difficulties Perceived by Teachers

Table 9 shows the difficulties reported by teachers. The most commonly reported difficulties encountered by teachers were the lack of motivation and incentives, financial constraints, and dry weather.

Table 9

Difficulties Encountered by Teachers

Difficulties Encountered	Cape Deaf	Jukwa	Total
Lack of motivation and incentives	1	5	6
Financial constraints	2	2	4
Dry weather/ lack of irrigation	3	-	3
Goats	-	2	2
Theft of produce	-	1	1
Coordination of students during holidays	-	1	1
Poor record-keeping/rendering of accounts	-	1	1
Poor student involvement in animal projects	-	1	1

Theft of produce, destruction by goats, coordination of students to maintain projects during holidays, problems with record keeping, and poor involvement of students in animal projects at Jukwa Secondary School were also mentioned.

Suggestions for School Authorities

Responses with respect to what school authorities should do to ensure sustainability of these projects is discussed in this section. The fourth research question of the study was, “How should school farm projects be managed by school authorities to ensure sustainability of in-school farm and garden projects?”

Students’ Suggestions

Suggestions made for school management by students from both schools included the provision of inputs and tools and giving incentives (See Table 10). The most frequently made suggestions by students of Cape Coast School for the Deaf were better record keeping practices and money earned from projects to be kept in a bank account. Also mentioned by students of both schools were suggestions to improve leadership, provide supervision and hire more labourers to assist with work on the projects especially during holiday periods.

Improved management of practical periods, use of improved farming practices, provision of a reliable water source, controlling thieves and allowing more student management of farm projects were further suggestions made by students of Jukwa Secondary School.

Table 10**Students' Suggestions for School Management**

Suggestions for school management	Frequency		
	CapeDeaf	Jukwa	Total
Provide tools/inputs	9	13	22
Give incentives	9	6	15
Better record keeping	14	1	15
Keep money in the bank	13	-	13
Improve leadership and supervision	2	4	6
Improve management of practical periods	-	4	4
Use improved farming practices	-	2	2
Hire more labourers	1	3	4
Mechanize labour	1	-	1
Provide reliable water source	-	1	1
Control thieves	-	1	1
Allow more student management of farm projects	-	1	1

Teachers' Suggestions

Suggestions made by teachers for school management are presented in Table 11. The suggestion by teachers made most frequently for school management was that school management should increase its involvement and commitment. They also stressed the need for provision of incentives. Both of

these suggestions were consistent with findings of previous studies (CRDD, 1994; CRDD, 2003).

Table 11

Teachers Suggestions for School Management

Suggestions for school management	Cape Deaf	Jukwa	Total
Increase involvement and commitment	3	3	6
Provision of incentives	1	3	4
Fencing	-	2	2
Increase supervision/maintenance	1	1	2
Provide financial support	1	1	2
Allow teachers freer hand in management	-	1	1
Keep club size manageable	-	1	1

General Suggestions for Improvement

The fifth and final research question was, “What improvements for school farm and garden projects are recommended by students and teachers?” Responses with respect to what can be done to improve school farm projects is discussed in this section.

Suggestions by Students

Suggestions made by students for the general improvement of school farm and garden projects are presented in Table 12.

In order to improve school farm projects students from both schools suggested that their percentages of profits on sales should be given regularly and

needed inputs should be provided. Students also suggested making better use of **the practical periods** on their time-table, improving leadership, instruction and **supervision**: increasing participation in the farm projects and practicing better **record keeping**.

Table 12

Students' Suggestions for Improvements

Suggestions for improvement	Frequency		
	CapeDeaf	Jukwa	Total
Percentages of profits should be give regularly	15	8	23
Provision of inputs/tools/equipment	2	13	15
Make better use of practical periods on timetable	7	1	8
Improve leadership supervision quality of instruction	-	7	7
Improve participation	-	6	6
Improve record keeping	2	2	4
Prevent stealing	1	-	1
Fence the farm	1	-	1
Protect the animals	-	1	1
Control pests and diseases	-	1	1
Give students animal projects	-	1	1
Hire labourer/caretaker during holidays	-	1	1

Students also mentioned that fencing their gardens, preventing stealing and controlling pests and diseases could improve their projects. The need to care

for farm projects during holidays was mentioned and a suggestion was raised that students should be given animal projects as part of their practical assignments.

Suggestions by Teachers

Suggestions made by teachers for the improvement of school farm and garden projects are presented in Table 13. The suggestions made most often by teachers for the general improvement of agricultural projects on their school farm were for the provision of incentives and increased financial inputs.

Table 13

Teachers' Suggestions for Improvement

Suggestions for improvement	Cape Deaf	Jukwa	Total
Provision of incentives	2	3	5
Increase financial inputs	1	2	3
Improve record keeping	1	1	2
Increase students' interest in animal rearing	-	2	2
Increase staff & student involvement	-	1	1
Coordination during holidays	-	1	1
Water supply	-	1	1
Training programmes	1	-	1
Exchange programmes	1	-	1
Celebrations (Agric. week)	1	-	1

Teachers' suggestions to improve record keeping supports their pleas for more transparent sharing of profits of farm sales. Providing for coordination of farm projects during the holidays was seen as important for improvement at Jukwa Secondary School as was the provision of a reliable water source. Also suggested for improvement at Jukwa Secondary School was increasing student interest in animal projects and getting more involvement and commitment of staff.

Teachers of Cape Coast School for the Deaf suggested that training and exchange programmes could enhance the projects. They indicated that organizing celebrations for Agriculture Week would go a long way toward encouraging their students and making them feel part of the mainstream.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents a summary of the findings of the study, the conclusions drawn from the findings, and recommendations to improve school farm projects and the management of such projects in order to achieve the aims of the agriculture curriculum. The findings are summarized for each of the research questions formulated to determine the perceptions of DASFA's school farm project interventions.

A descriptive survey research design of the retrospective pre-post type was used to collect data for this study. Two schools in the Central Region which had received school farm project support from DASFA were purposively sampled. These schools are: Cape Coast School for the Deaf which is a Basic school that has students up through the Junior Secondary level, and Jukwa Secondary School. Students rated their perceived competencies before and after DASFA's school farm project interventions. A t-test was used to determine the significance of the difference between pre-project and post-project perceived competency levels. Mean competency gains and frequencies were also computed and tables constructed to summarize the data.

Summary of Findings

Students' Perceptions of School Farm Project Interventions

The first research question sought to address students' perceptions of DASFA's in-school agricultural project interventions in terms of acquisition of knowledge and skills. The results showed that students of both schools involved in the study gained knowledge and acquired skills in agricultural enterprises after the school farm project interventions. Positive perceived competency gains were reported in all four of the enterprises looked at in this study: vegetable production, grasscutter rearing, rabbit rearing, and production of pigs. For vegetable production the highest gains for students of the Cape Coast school for the Deaf occurred in nursery bed preparation, nursery practices, healthy seed selection, fertilising and integrated pest management (IPM), while for the Jukwa Secondary School the highest reported gains were in the areas of nursery bed preparation, healthy seed selection, pest control (IPM) and record keeping. For both schools the lowest gains were in the areas of weeding and harvesting which was not surprising because the students might have had prior experience in these areas.

For activities related to grasscutter rearing, students from both schools indicated increases in their perceived competencies after the school farm project interventions. At Cape Coast School for the Deaf the highest gains were indicated in feed preparation, record keeping, handling of the animals and cleaning of animal housing. Before the farm project interventions students of Cape Coast School for the Deaf rated themselves as having low competencies in activities

related to grasscutter rearing especially in the areas of record keeping, handling of the animals, feed preparation, and health care of the animals. After the project interventions the activities which had the lowest perceived competencies at Cape Coast School for the Deaf were in the areas of record keeping and handling of animals.

At Jukwa Secondary School the competency level of students in activities related to grasscutter rearing before the project interventions was moderate. Competency gains in grasscutter rearing were higher than the other three enterprises examined (vegetable production, rabbit rearing and production of pigs). The greatest increases in perceived competencies after the project interventions were in the areas of handling of animals and breeding. In both schools activities such as feeding, giving water and cleaning the housing showed the lowest competency gains. This could be because these activities are more common and students possibly had previous similar experiences with other animals they were more familiar with.

All activities in rabbit rearing at both schools showed increases in perceived competencies after the school farm project interventions of DASFA. At Cape Coast School for the Deaf, rabbit rearing activities showed the highest gain over all the other enterprises examined. The highest gain at Cape Coast School for the Deaf was in the area of feed preparation. The activity which showed the lowest gain was record keeping.

Students of Jukwa Secondary School reported their highest competency gains in rabbit rearing activities in the areas of handling and health care of the

animals and in the preparation of feed. In both schools routine activities such as cleaning of animal housing, feeding and giving water to animals indicated low gains because students were familiar with these activities.

Competencies related to the production of pigs were perceived to have increased in both schools after the project interventions of DASFA. Students of Cape Coast School for the Deaf reported the highest increases in competencies of feed preparation, cleaning of housing and handling of animals. Students of Jukwa Secondary School indicated their highest perceived competency gains to be in castration and feed preparation.

Teachers' Perceptions of School Farm Project Interventions

Results from the second research question showed that teachers from both schools rated inputs provided for four enterprises (vegetable production, grasscutter rearing, rabbit rearing and pigs production) as being helpful in contributing to their efforts to implement the agriculture curriculum. Cash inputs, training, and supervision were also indicated as being helpful to them in their educational efforts.

Teachers of Cape Coast School for Deaf reported all inputs provided by DASFA as being very helpful. The inputs found most helpful to teachers at Cape Coast School for the Deaf were in the production of pigs. Teachers from Jukwa Secondary School rated DASFA's inputs as being moderately helpful in assisting them to attain the goals of the curriculum. At Jukwa Secondary School teachers indicated that inputs for vegetable production were the most helpful.

Inputs in terms of cash and training were indicated at both schools as being the least helpful of the areas surveyed. The low ratings for the helpfulness of cash and training inputs could be because teachers expected higher levels of these inputs than was provided.

Difficulties Encountered by Students and Teachers

Finding associated with the third research question which sought to identify difficulties encountered by students and teachers in implementing in-school agricultural projects revealed a number of difficulties which they faced as they carried out activities on their school farms. These included: dry weather, lack of tools, equipment and other inputs, poor use of practical periods on their timetable, and the loss of produce due to thieves and stray animals.

Additional difficulties mentioned were: the lack of strong leadership and supervision, the lack of incentives given to teachers and students, lack of available market for the sale of produce, poor participation in field activities, lack of teaching on animals at Jukwa Secondary School, and the demanding nature of work on farm activities.

Teachers indicated the following as the most commonly faced difficulties: the lack of motivation and incentives, financial constraints, dry weather, theft of produce, destruction by goats, coordination of students to maintain projects during holidays, and problems with record keeping. Poor involvement of students in animal projects at Jukwa Secondary School was also an expressed concern.

Students' and Teachers' Suggestions for School Management

The fourth research question sought suggestions from teachers and students concerning the sustainability of their school farm and garden projects. Students suggested that school management should provide inputs and tools and give incentives. They should also strive to keep better records and to practice more transparency where cash earned from projects is involved. They also called for improved leadership, supervision, provision of a reliable water source, controlling thieves and hiring of more labourers to assist with work on the projects especially during holiday periods. Students also suggested that better use could be made of their practical periods. Students of Jukwa Secondary School also called for more use of improved farming practices and suggested allowing more student management of farm projects.

Teachers suggested that school management should increase its involvement and commitment. They called for increased supervision and maintenance of the school farm project activities and stressed the need for management to provide more financial support. Fencing of the school farm was one of the specific needs indicated. Allowing teachers a freer hand in the management of the projects was also suggested as was the need for provision of incentives.

Students' and Teachers' Suggestions for Improvement

Findings related to the fifth research question identified a number of suggestions by students and teachers as to how their in-school farm projects supported by DASFA could be improved. Students indicated that their

percentages of profits on sales should be given regularly in order to improve their projects. They also suggested that more inputs such as tools and pesticides should be provided. They called for improving leadership, instruction and supervision. Students also suggested that better use should be made of the practical periods on their time-table. They called for increased participation in the farm projects and for practicing better record keeping. Students also mentioned that fencing their gardens, preventing stealing and controlling pests and diseases could improve their projects. The need to care for farm projects during holidays was mentioned and a suggestion was raised that students should be given animal projects as part of their practical assignments.

The suggestions made most often by teachers for the general improvement of agricultural projects on their school farm were for the provision of incentives and increased financial inputs. They called for the improvement of record keeping practices and for more transparent sharing of profits of farm sales. Providing for coordination of farm projects during the holidays was also seen as important for improvement at Jukwa Secondary School as was the provision of a reliable water source. Also suggested for improvement at Jukwa Secondary School was increasing student interest in animal projects and getting more involvement and commitment of staff.

Teachers of Cape Coast School for the Deaf suggested that training and exchange programmes could enhance the projects. They indicated that organizing celebrations for Agriculture Week would go a long way toward encouraging their students and making them feel part of the mainstream.

Conclusions

Project interventions of the NGO, DASFA, in the two school project sites examined in this study were perceived by students and teachers to be effective in achieving the aim of promoting the effective teaching and learning of practical Agriculture. The project interventions were perceived as making a desirable impact on the development of competencies and skills in all four agricultural enterprises examined in the study: vegetable production, grasscutter rearing, rabbit rearing and production of pigs.

The sustainability of such positive outcomes in the teaching of Agriculture as a practical subject will depend on the extent to which conditions such as those identified in this study are met. Inputs which are lacking for in-school agricultural projects need to be provided. These include inputs for vegetable production and animal rearing and the supply of water and water storage to be used in farm activities during the dry season.

For the successful delivery of the agriculture curriculum, school management has a role to play in more widely involving staff and encouraging stronger commitment. Supervision of in-school farm projects and the transparent keeping of records and consistent sharing of profits realized on farm produce is also needed to sustain the interest and encourage the efforts of staff and students.

In order to overcome difficulties in implementing in-school agriculture projects there is a need for provision of adequate security for school farms to check losses due to theft and destruction by stray animals. Adequate care during holiday periods is also needed for the school farm projects.

Provision for training for teachers and farm assistants is also needed to overcome difficulties in the practical teaching and learning of agriculture.

Recommendations

Based on the findings and conclusions of this study, the following recommendations are made:

1. NGOs involved in agriculture education as well as other stakeholders should be encouraged to play more active roles in supporting the implementation of the school agricultural curriculum, especially in supporting the establishment of viable teaching and learning school farms and gardens. This can be achieved through financial support or facilitation of technical inputs for training and management.
2. Because the project interventions proved successful in the two schools examined it is recommended that similar initiatives should be duplicated in other regions of the country.
3. In order to achieve success in attaining the goals of agriculture education, needed inputs for the development of school farm enterprises should be provided. Adequate budgetary allocations should be made by school heads and management committees.
4. Supervision, maintenance and support for in-school farm projects should be provided. This can be done by giving practical activities carried out as part of the agriculture curriculum the same amount of attention by management as the classroom activities attract.

Supervision should be carried out for practical activities on school farms just as diligently as in the classroom and should actively involve teachers and management staff.

5. The provision of training for teachers on current improved practices should be given attention in order to give them the opportunity to upgrade themselves. Teachers should be supported to attend in-service training and conferences such as those held by The Agriculture Science Teachers Association of Ghana (ASTAG).
6. Students should be given animal projects in addition to the garden projects currently practiced.
7. Better use should be made of the practical periods provided for agriculture on the timetable.
8. Record keeping should be consistent and transparent to provide accurate information on activities and ensure accountability.
9. Incentives should be given on a regular basis. These should include the sharing of profits from farm produce and livestock and may also take the form of recognition such as praise, prizes and certificates for efforts in the practice of agriculture enterprises.
10. Field trips and educational excursions should be undertaken by teachers and students to other schools with viable gardens and farms to enable them to benefit from one another's experiences and to exchange ideas.

Suggestions for Future Research

It is suggested that further research could be carried out in schools across the country to provide more generalized results. Further studies could also be undertaken to explore sustainable funding avenues for school farms and gardens.

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Retrospective Pre-Post Questionnaire for Students' Perceived Impact of DASFA's School Farm Project Intervention

Introduction: You have been selected to participate in this study because you have participated in activities of your school farm project which was assisted by the NGO Development Assistance to School Farms (DASFA). The information you provide will be treated as confidential and will be analysed together with other information provided by your peers. The purpose of this study is to find out if DASFA's school farm project intervention has had any effect on your abilities in the agricultural areas being assessed. Thank you for agreeing to participate in the study. Please provide sincere answers.

Instructions: There are five sections in this questionnaire. The first four sections are intended to measure your perceived abilities in vegetable production, grasscutter rearing, rabbit rearing and pigs production. The fifth section has questions that will provide background information and suggestions for improving school farm project activities. Please answer ALL questions.

Section 1: Vegetable production

Below you will find three columns. The middle column describes areas where you have received knowledge and skills in **vegetable production** through training supported by DASFA's farm project in your school. READ each statement carefully.

In the column at the **left** side of each statement CIRCLE the number that best represents your perceived ability or competency **BEFORE** the project.

In the column to the **right** side of each statement CIRCLE the number that best represents your perceived ability or competency **AFTER** the project.

The numbers are interpreted as follows:

1 = Very Poor; 2 = Poor; 3 = Fair; 4 = Good; 5 = Very Good.

My Competency BEFORE DASFA Project Intervention					Project Intervention Areas For Vegetable Production	My Competency AFTER DASFA Project Intervention				
Very Poor	Poor	Fair	Good	Very Good		Very Poor	Poor	Fair	Good	Very Good
1	2	3	4	5		1	2	3	4	5
1	2	3	4	5	- Nursery bed preparation	1	2	3	4	5
1	2	3	4	5	- Nursery practices	1	2	3	4	5
1	2	3	4	5	- Vegetable bed preparation	1	2	3	4	5
1	2	3	4	5	- Healthy Seed selection	1	2	3	4	5
1	2	3	4	5	- Transplanting	1	2	3	4	5
1	2	3	4	5	- Watering	1	2	3	4	5
1	2	3	4	5	- Fertilising	1	2	3	4	5
1	2	3	4	5	- Weeding	1	2	3	4	5
1	2	3	4	5	- Pest Control (IPM)	1	2	3	4	5
1	2	3	4	5	- Harvesting	1	2	3	4	5
1	2	3	4	5	- Record Keeping	1	2	3	4	5

Section 2: Grasscutter Rearing

Below you will find three columns. The middle column describes areas where you have received knowledge and skills in **grasscutter rearing** through training supported by DASFA's farm project in your school. READ each statement carefully.

In the column at the **left** side of each statement CIRCLE the number that best represents your perceived ability or competency **BEFORE** the project.

In the column to the **right** side of each statement CIRCLE the number that best represents your perceived ability or competency **AFTER** the project.

The numbers are interpreted as follows:

1 = Very Poor; 2 = Poor; 3 = Fair; 4 = Good; 5 = Very Good.

My Competency BEFORE DASFA Project Intervention					Project Intervention Areas For Grasscutter Rearing	My Competency AFTER DASFA Project Intervention				
Very Poor 1	Poor 2	Fair 3	Good 4	Very Good 5		Very Poor 1	Poor 2	Fair 3	Good 4	Very Good 5
1	2	3	4	5	- Preparation of Feed	1	2	3	4	5
1	2	3	4	5	- Feeding of Animals	1	2	3	4	5
1	2	3	4	5	- Giving water to animals	1	2	3	4	5
1	2	3	4	5	- Cleaning of Housing	1	2	3	4	5
1	2	3	4	5	- Health Care of Animals	1	2	3	4	5
1	2	3	4	5	- Handling of Animals	1	2	3	4	5
1	2	3	4	5	- Breeding (Crossing) of animals	1	2	3	4	5
1	2	3	4	5	- Record Keeping	1	2	3	4	5

Section 3: Rabbit rearing

Below you will find three columns. The middle column describes areas where you have received knowledge and skills in **rabbit rearing** through training supported by DASFA's farm project in your school. READ each statement carefully.

In the column at the **left** side of each statement CIRCLE the number that best represents your perceived ability or competency **BEFORE** the project.

In the column to the **right** side of each statement CIRCLE the number that best represents your perceived ability or competency **AFTER** the project.

The numbers are interpreted as follows:

1 = Very Poor; 2 = Poor; 3 = Fair; 4 = Good; 5 = Very Good.

My Competency BEFORE DASFA Project Intervention					Project Intervention Areas For Rabbit Rearing	My Competency AFTER DASFA Project Intervention				
Very Poor	Poor	Fair	Good	Very Good		Very Poor	Poor	Fair	Good	Very Good
1	2	3	4	5		1	2	3	4	5
1	2	3	4	5	- Preparation of Feed	1	2	3	4	5
1	2	3	4	5	- Feeding of Animals	1	2	3	4	5
1	2	3	4	5	- Giving water to animals	1	2	3	4	5
1	2	3	4	5	- Cleaning of Housing	1	2	3	4	5
1	2	3	4	5	- Health Care of Animals	1	2	3	4	5
1	2	3	4	5	- Handling of Animals	1	2	3	4	5
1	2	3	4	5	- Breeding (Crossing)	1	2	3	4	5
1	2	3	4	5	- Record Keeping	1	2	3	4	5

Section 4: Pigs production

Below you will find three columns. The middle column describes areas where you have received knowledge and skills in **pigs production** through training supported by DASFA's farm project in your school. READ each statement carefully.

In the column at the **left** side of each statement CIRCLE the number that best represents your perceived ability or competency **BEFORE** the project.

In the column to the **right** side of each statement CIRCLE the number that best represents your perceived ability or competency **AFTER** the project.

The numbers are interpreted as follows:

1 = Very Poor; 2 = Poor; 3 = Fair; 4 = Good; 5 = Very Good.

My Competency BEFORE DASFA Project Intervention					Project Intervention Areas For Pigs Production	My Competency AFTER DASFA Project Intervention				
Very Poor	Poor	Fair	Good	Very Good		Very Poor	Poor	Fair	Good	Very Good
1	2	3	4	5		1	2	3	4	5
1	2	3	4	5	- Preparation of Feed	1	2	3	4	5
1	2	3	4	5	- Feeding of Animals	1	2	3	4	5
1	2	3	4	5	- Giving water to animals	1	2	3	4	5
1	2	3	4	5	- Cleaning of Housing	1	2	3	4	5
1	2	3	4	5	- Health Care of Animals	1	2	3	4	5
1	2	3	4	5	- Handling of Animals	1	2	3	4	5
1	2	3	4	5	- Breeding (Crossing) of animals	1	2	3	4	5
1	2	3	4	5	- Caring for the young	1	2	3	4	5
1	2	3	4	5	- Castration	1	2	3	4	5
1	2	3	4	5	- Record keeping	1	2	3	4	5

Section 5

1. Age at last birthday 2. Sex;MaleFemale
3.School 4. Level..... JSSSSS

5. To what extent do you think DASFA project activities have helped your academic performance?

None	Little	Much	Very Much
1	2	3	4

6. What difficulties did you face in carrying out school farm project activities?

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7. What do you think can be done by school management to sustain school farm project activities?

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8. How do you think activities can be improved on your school farm?

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**Questionnaire for Teachers' Perceived Impact of DASFA's
 School Farm Project Intervention**

Section 1

Instructions: Below is a list of items indicating support provided by DASFA. Please indicate the extent to which each project item has contributed to the implementation of the practical agriculture curriculum in your school.

The numbers are interpreted as follows:

1 = None; 2 = Little; 3 = Much; 4 = Very Much

Agricultural Project Items	Contribution to Implementation of Practical Agriculture Curriculum			
	None 1	Little 2	Much 3	Very Much 4
Inputs for vegetable production (seed, fertilizer, EarthBoxes, etc.)				
Inputs for grasscutter production (breeding stock, housing/cages)				
Inputs for rabbits production (breeding stock, housing/cages)				
Inputs for pigs production (breeding stock, housing)				
Training support for school farm enterprises				
Cash support for school farm enterprises				
Supervision				

Section 2

Instructions: Please answer the following questions as briefly and clearly as possible.

1. What difficulties did you face in carrying out school farm project activities?

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2. What do you think can be done by school management to sustain school farm project activities?

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3. How do you think activities can be improved on your school farm?

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4. School: District: