

PRIMARY SCHOOLING AND AGRICULTURAL EDUCATION IN KENYA:
CAN PRINCIPLES OF "MODERN" AGRICULTURE BE
TAUGHT EFFECTIVELY IN SCHOOLS?

By

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A Thesis Submitted to the Faculty of Graduate Studies and
Research in partial fulfillment of the requirements for
the degree of Doctor of Philosophy

July 1990.

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ABSTRACT

This study explored the teaching of agriculture in Kenya's primary schools. It sought in particular to determine how the principles of "modern" agriculture may be taught effectively.

Previous studies on education and agricultural productivity have ignored the mechanisms through which schooling affects the acquisition of agricultural knowledge and skills. This study attempted to bridge this gap. To do so field work was carried out in four schools and their catchment areas in Kiambu and Kwale districts of Kenya. The data stemmed from field notes, tape recorded lesson transcripts, interviews and questionnaires as well as an exhaustive review of prior studies and government documents.

The findings indicate that the schools offer possibilities for effective teaching of the principles of "modern" agriculture. However, whether or not the school will play this role well or poorly depends largely on the improvement in general of the quality of primary schooling. This task involves increasing school resources, modification of the agricultural curriculum, improvement of teacher training, change in teaching methods and assessment policies.

RÉSUMÉ

Cette étude avait pour objet l'enseignement de l'agriculture dans les écoles primaires du Kenya. L'auteur visait particulièrement à déterminer des moyens permettant d'enseigner de façon efficace les principes de l'agriculture "moderne".

Les études réalisées antérieurement sur l'éducation et la productivité agricole n'ont pas tenu compte des mécanismes par lesquels la scolarisation affecte l'acquisition des connaissances et techniques agricoles. La présente étude visait à combler cette lacune. À cette fin, des travaux ont été réalisés sur le terrain à partir de quatre écoles et de leurs zones de recrutement, dans les districts de Kiambu et de Kwale. Les données ont été tirées des observations faites sur le terrain, des transcriptions d'enregistrements de leçons, d'entrevues et de questionnaires, ainsi que d'études antérieures et de documents gouvernementaux.

Les résultats de l'étude indiquent que les écoles sont en mesure d'assurer efficacement l'enseignement des principes de l'agriculture "moderne". Toutefois, la mesure dans laquelle les écoles jouent ce rôle est fonction de l'amélioration générale de la qualité de l'enseignement primaire. Cette tâche nécessite l'accroissement des ressources dont dispose l'école, la modification des programmes d'enseignement agricole, l'amélioration de la formation des enseignants et la modification des méthodes pédagogiques et des politiques d'évaluation.

ACKNOWLEDGMENTS

This thesis has benefited immensely from a large number of people and organizations. Among the individuals, special thanks are due to Professor R. Ghosh, my supervisor, and members of my committee: Dr. G. Anderson, Dr. A. Cleghorn and Dr. J. Galaty, who provided invaluable guidance and useful comments at various stages in the preparation of this dissertation. Their support has aided me greatly and I am indebted to them for all their generous assistance.

I should like to acknowledge with thanks all the teachers, students and parents who participated in this research. There are no words to thank them, but to recognize their useful contribution. Without them this thesis could have not been written.

Many thanks are due to International Development Research Centre (IDRC) for providing me with the scholarship that enabled me to study at McGill. Special thanks to Professors I. Omari and G. S. Eshiwani who initiated and supported my award. I also wish to express my gratitude to Aline Guay who made sure that my stipend and other supplies were always on time. I am grateful to Kenyatta University

for granting me study leave. Special thanks to members of the Department of Educational Foundations who gave me moral support.

Many people gave me support, in one way or the other, during my study at McGill. Their friendship, particularly those of non-teaching staff in my department, made me comfortable and this thesis owes much to them. My sincere gratitude to all of them. Special thanks to Rashida Keshavjee for her useful comments and assistance.

Finally, there are special people I can not thank enough. I am greatly indebted to my wife Florence, my son Oliver and my daughter Irene for their sacrifice and patience during my absence from Kenya while studying at McGill. I dedicate this thesis to them, and say "Aheruo molooyo". I also thank my parents who laid the basic foundation for my education.

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CHAPTER ONE

BACKGROUND TO THE STUDY

The Nature and Scope

Colonialism in the nineteenth century brought a market-oriented European way of life into essentially agrarian and subsistence societies in Africa. Ever since, the African societies have been undergoing social, technological and institutional changes, which continue to interact with indigenous practices. As a result, the pace of change in Africa has differed markedly from that of the west where "progress" moves ahead rapidly, unimpeded by financial, cultural and other constraints of Third world development. (Coombs, 1985; Fafunwa, 1973; Nyerere, 1967). These trends create but a few of the patterns that are reflected in African schools, which are entrusted, implicitly or explicitly, with the dual task of maintaining the society and of implementing social change.

Over the last two decades, there have been increased efforts in Africa to relate primary education to development in general, and to rural development in particular (Coombs,

1985; Kenya Government, 1976, 1984; Thompson, 1983; Unesco, 1976). Various studies have shown that primary schooling in Africa, like in other Third World countries, increases productivity in all sectors of the economy, and the economic returns to investment in primary education are greater than those arising from other levels of schooling (Colclough, 1986). Thus, primary schooling is seen as a better option for investment in an attempt to facilitate rural development. The present study is concerned with primary schooling and Agricultural Education in Kenya, and aims to examine whether principles of "modern" agriculture can be taught effectively in the school.

Although the abiding faith in formal education to facilitate development has persisted and expenditures in formal education have increased, the causal relationship between formal education and rural development has been a subject of major debate since the 1970s. Researchers, planners, and educators have pointed out that formal education in Third world countries has often failed to prepare students to fit into their society (Coombs, 1985; Ferge, 1981; Heyneman and White, 1986; Nyerere, 1967; Psacharopoulos, 1985; Sifuna, 1984). The focus has been on quantitative assessment of educational outcomes and their

relationship to rural economies. However, a sound strategy of how schooling can improve the quality of educational output, and especially influence the application of what is learned to promote rural development, has not been developed.

The question of what role the primary school can and should play in promoting rural development has dominated the literature of education in Africa. There are two major reasons for this. First, the majority of the African population is rural and agriculture is the dominant sector of the economy. Second, the majority of the youths (about 60%) terminate their schooling at primary level and live and work in rural areas. Consequently, it would appear that primary schooling offers possibilities of facilitating rural development in general, and innovation in agriculture in particular.

In Kenya, as in many African countries, the outstanding achievement has been the enormous expansion of educational opportunity at all levels since independence in 1963, although the expansion has been accompanied by high expenditure in education (Eshiwani, 1983; Kenya Government, 1988). The unprecedented expansionist education policy was spurred largely by national objectives of promoting national

unity, economic growth, social equality, and human resource development. However, expansion of educational opportunities has been accompanied by a rapid increase in the problem of "educated" unemployed. More crucial, rural development has not proceeded at the rate anticipated at independence.

By the early 1980s the Kenyan government realized that reorganization of the education system was necessary. A new education system, commonly referred to "8-4-4" was instituted ("8-4-4" refer to 8 years of primary schooling, 4 years of secondary education and 4 years of university education to obtain a basic bachelor's degree) replacing the education system (7 years of primary, 4 years of secondary, 2 years of high school, and 3 years of university education) which had been in effect since independence. The 8-4-4 system of education aims at responding to the challenge of national development and the active participation of the youth in development (Kenya Government, 1984, p. 1).

The 8-4-4 system of education contains a heavier practical component at all levels than was previously the case. Primary education is now intended to equip primary school students with skills that will enable them to contribute towards the development of rural society and its

environment. Since the majority of primary school graduates do not proceed to secondary schools and live and work in rural areas, primary schooling is accorded more importance as an entity in itself. To this end, agriculture has been re-introduced as a compulsory, examinable subject.

This re-emphasis on agricultural education, particularly at the primary level, raises major questions. How is agriculture taught in Kenyan primary schools? How can agricultural instruction be improved to cope with the teaching of "modern" agriculture? Does schooling play a positive role in agricultural development, and if so in what way? Such questions have not been the focus of educational research in Kenya until recently. Previous research on agricultural education has concentrated on the secondary agricultural curriculum and has tended to be historical in nature (Ruparanganda, 1980; Sifuna, 1984).

This study is an attempt to add to the small but growing body of research on the modernization of peasant agriculture in Kenya through primary schooling. The study was addressed towards one major question: can principles of "modern" agriculture be taught effectively in primary schools? The word modern refers to improved, adapted and efficient

principles of agriculture which combine both western and indigenous technologies and practices.

More specifically, the purpose of the study was to examine the teaching of agriculture in Kenyan primary schools, to determine how agricultural instruction is used to teach the principles of "modern" agriculture, with the aim of enhancing students' capacities to understand and effectively apply what is learned. To realize these purposes, the study undertook to do the following:

1. to analyze the primary school agricultural curriculum with particular regard to its relationship to community small-scale agricultural practices;
2. to describe how agriculture is actually taught in Kenyan primary schools; and how classroom theory is translated into actual practice on school plots;
3. to examine the extent to which the school agricultural plots act as a form of extension to community agricultural practices and development;

4. to examine the possibilities of strengthening the capacity of primary schools to teach effectively about principles of modern agriculture.

The field work for this study was carried out in four primary schools and their catchment areas in Kiambu and Kwale Districts of Kenya. Kiambu, in Central province, is a rich agricultural district. Kwale is a district of the Coast province. Due to ecological and cultural factors, to be discussed in Chapter III, the agricultural potential of Kwale is not as developed as that of Kiambu. By selecting contrasting environments for this study, the intention was to illuminate as fully as possible the scope of the relationship in Kenya between agricultural instruction and agricultural practice.

Rationale

Kenya's national development objectives and planning are reflected in a recently introduced approach to development known as "The District Focus for Rural Development Strategy" (Kenya Government, 1981, 1988). Recent economic and other surveys indicate that agricultural productivity, particularly food production, has decreased between 1985 and 1988. Maize

(a staple food) production, in particular, recorded a decline of twenty-five percent, while potatoes, beans, and wheat also recorded decreased production (Kenya Government, 1984, 1988). The study thus ties into the government's intensified efforts to develop the agricultural sector by focusing on the role of schooling in rural development in general, and in agricultural practice in particular.

The study is important in that there is a need to improve the quality of primary education as expansion increases at a rate that outstrips the country's economic ability to meet the need. Primary education has to be adaptive and creative to enable individuals acquire knowledge, skills and attitudes which will permit them to effectively participate in the development of their society. In addition, by addressing the question of congruence between the content of agricultural curriculum, school instruction and agricultural practice, this study addresses the potential multiplier effect of schooling. That is, the study examines the relationship between theoretical and practical agricultural instruction in school vis-a-vis the application of knowledge and skills out of school. At this level, the study touches on what is known in educational psychology about the nature of learning and the nature of cognitive

transfer in cross-cultural contexts (Cleghorn and Bunyi, 1990; Eisemon, 1988; Husinger, 1973; Roller, 1988).

Finally, it is hoped that this work will result in some practical implications for education policy and practice, for curriculum development and/or the use of school plots for economic gains. In such ways agriculture that is taught in school might take the pressure off parents to pay for all educational costs, and even foster more positive attitudes to employment in the agricultural sector.

Some limitation in scope and time are pertinent to this study. Because the field-work had to be completed within a period of seven months, and because funds were limited, the number of districts and schools which could be included in the study were limited. However these limitations allowed for an in-depth picture of agricultural instruction in Kenya to be developed. While the two districts selected for the study provide some marked contrasts, they also demonstrate the complete range of agricultural practice in Kenya. This being said, the findings do not pretend to revolutionize on ideas about the teaching of agriculture in Kenya's primary schools. Rather it is intended that a contribution will be made to the theoretical basis upon which agricultural

instruction can be built and made more effective while suggesting new avenues for research too.

The thesis is divided into six chapters. Chapter I sets the context (dimensions) of the study by presenting the nature and rationale for the study. The debate on the role primary schooling can, and should, play in rural development is examined.

Chapter II presents the methodological approach used in the study. Research instruments and procedures for data collection are described. The demographic data pertaining to teachers, students and parents in the study's two districts, Kiambu and Kwale, are also presented.

Chapter III examines the development of agricultural education and its inclusion in the primary school curriculum in Kenya. The content of the agriculture curriculum and its relationship to small-scale community agricultural practices is also discussed. In the final section of the chapter, Kiambu and Kwale districts are described.

Chapter IV describes the teaching of agriculture in the four schools studied. The first section of the chapter deals

with in-class teaching, in particular the constraints on the effective teaching of agriculture. The second section deals with agricultural instruction and enhancement of students' knowledge in agriculture. And the last section examines the link between school instruction and community practices.

Chapter V discusses the strengthening of agriculture instruction in the overall context of the Kenya government's aim to improve agricultural practice. Section one presents the data obtained from teachers, students and parents about agricultural instruction. And the second section examines ways that the quality of instruction in general and of agriculture in particular might be improved.

The Sixth and final chapter gives a summary and conclusion of the findings. It also proposes a number of policy implications.

Primary Schooling and Rural Development

The recent literature concerning primary education and rural development is primarily of three types. The first has questioned the relevance of primary education and has tended to point out the failure of the school to facilitate rural development. The inherited education system is seen as being too academic and not imparting skills and attitudes needed for rural development. The second category of literature most often views the school as not responsible for the problem of "educated" unemployed and rural-urban migration. It points out that the tendency to view schooling as a panacea for social-economic ills, stems from comes from the lack of a clear understanding or appreciation of the dynamics of the complex relationship between the education system and the socio-economic structure of the society. The third body of literature comes from recent research which has established a correlation between schooling and agricultural productivity in Third World countries.

This section presents literature on the debate about the potential role of schooling on development in general, and rural development in particular, and what it actually reveals about the mechanisms through which the school plays

its role.

Schooling and Development

The purpose of education in any society is to transmit from one generation to the next the accumulated wisdom and knowledge of the society, to prepare the youths for their future membership in society and their active participation in its development (Dreeben, 1969; Fafunwa, 1973; Morrison, 1973; Nyerere, 1965). Zachariah (1986) defines schooling as a "process by which a person's ignorance is removed: it makes that person aware of the choices available to him or her to develop physically, mentally, and spiritually" (p. 68).

In contrast, the concept of development has been understood as a social change in a desirable direction. Furtado (1977) developed three criteria for analyzing national development. These are: 1) whether there has an increase in the efficiency of the production system of a society, 2) the satisfaction of the population's basic needs, and 3) the attainment of the objectives sought by various groups in society (cited in Fagerlind and Saha, 1985, p. 28). To these it is important to add the active participation of individuals in development processes.

The faith in education by governments, policy makers and the public has reinforced efforts to interface education and the world of work. The general assumption has been that the development of human resources through formal education, will: 1) solve the growing problem of the "educated" unemployed, 2) justify the increased expenditure in education by governments and the public, and 3) address the problem of rural-urban migration by providing alternative strategies for rural development.

It is universally agreed that formal education is a powerful tool in promoting national development. The literature shows that formal education has been linked to socio-economic development of countries all over the world. Two theories responsible for the wholesale adaptation of education as a major vehicle for development are the "Human Capital theory" and the "Modernization theory."

The Human capital theory is based on the works of economists such as Schultz (1961) and Denison (1962). The theory rests on the assumption that formal education is instrumental and necessary to improve the productive capacity of individuals. An investment in education is an investment in the productivity of the population (Denison, 1962;

(Fagerlind and Saha, 1985; Schultz, 1961). On the other hand, the Modernization theory has been developed by sociologists to explain the investment value of education from a sociological perspective. The underlying assumption is that "in order for a society to become modern (to develop economically and socially), it must be composed of a modern population, meaning modern values, beliefs and behavior" (Fagerlind and Saha, 1985, p. 48).

Both economists and sociologists agree that education brings about change in an individual through increased work efficiency and productivity. The progress of a nation depends on the progress of its people. Unless peoples' knowledge, skills, values, attitudes, and behaviors are developed, a country cannot develop socially and economically.

The linkage between schooling and development has prompted several studies on the internal and external efficiency of education, particularly in developing countries (Coclough, 1980; Noor, 1981; Psacharopoulos, 1982; Gounden, 1987). Multinational agencies, like the World Bank, have played a key role in sponsoring such projects. However, two issues have not been subjected to thorough examination:

first, "the economic yield to be anticipated from an investment in educational quality (as opposed to expansion)", and second "the degree to which such investment can be effectively implemented" (Heyneman, 1986, p. 1-3).

The relationship between formal education and development in Third World countries manifests characteristics related to the level of economic growth. The educational system, structure and curriculum is oriented towards the needs of economies based on high level technologies and flexible, mobile labour forces (Fagerlind and Saha, 1983, p. 71). This implies that the schools must prepare individuals to adjust to frequently changing job situations. On the other hand, in Third World countries, the different economic conditions - a dual economy (the modern and traditional sectors - requires the educational system to build upon human resources which are somehow unique to those in western countries. The simple transplant of school models from developed nations to developing countries is likely to be detrimental.

Education systems in Third World countries tend to suffer a setback caused by a tendency of these countries to copy school models from developed nations. The past decade

has been marked by positive changes in education: expansion and improvement of education, increase of educational resources, reduction of illiteracy and the emergence of new programs of continuing (non-formal) education. However, this period has also been marked by negative changes: problems of "educated" unemployed, rural-urban migration and high increase in educational expenditure (Coombs, 1985; Court and Kinyanjui, 1988; Psacharopoulos and Woodhall, 1988). These have not prevented governments and the public from investing heavily in education. In Kenya for example, formal education takes about 35% of the recurrent national budget, while household expenditure in education averages 20% of annual income (Government of Kenya, 1988).

Historical evidence shows that governments and educational planners have developed and implemented educational curricula that are supposed to cater for national development. Now and then Third World countries and international organizations have instituted educational commissions to review past educational systems. The popular assumption has been that the education provided in the past has been a hindrance to rural development and a major cause of "educated" unemployment (Kinyanjui, 1979).

Despite the interest and heavy investment by national and international agencies in expanding education in Third world countries, formal education has not sufficiently equipped the countries to tackle and solve their problems adequately. Even in places where western education has existed for over a century, Third World countries still rely on western nations for their educational programs and general development (Onwako, 1973; Noor, 1981; Fafunwa, 1973). Recently international agencies, educational researchers and planners have come up with alternative suggestions on approaches and strategies of making formal education more relevant to the needs of Third World countries. For example, there is increased interest in ways of integrating productive work activities with the more academic aspects of schooling (CIDA, 1988, Psacharopoulos and Woodhall, 1988; World Bank, 1989).

The implication is that formal education has not been related to local needs and resources. Specifically, formal education in Third World countries has neglected rural areas where the majority of people live and where agriculture is the dominant sector in the economy. The neglect of rural development needs seems to be related to the "problem" of a centralized curriculum that is supposed to provide an "equal"

education to all (equal = same). But equal may in fact require different strategies, which raises the question of local planning and decentralization.

In Africa, as in many Third World countries, primary schooling is being recognized by both policy makers and academicians to be crucial in rural development. Writing about the issue, Colclough pointed out that,

in countries where a large proportion of the working population is dependant upon farming, and where rates of illiteracy are very high, primary schooling thus provides an investment opportunity which ought to have high priority on economic grounds

(Colclough, 1986, p. 19).

However, whether or not primary schooling should be a major focus of investment in Third World countries has created interesting debate from the 1960's.

Does Schooling Lead to Alienation from Rural Life?

In the last two decades a great deal of literature has appeared on the influence of primary education on African societies, with the assertion that schooling leads to alienation of youths from rural life, farming and from any occupation associated with manual work. This increases the problem of "educated" unemployment and rural-urban migration.

The contention has been based on the assumption that the conventional school curriculum has been too academic and not geared towards imparting skills and values needed for rural development (Coombs, 1975; 1985; Faure, 1972; Kenya Government, 1976, Lewis, 1970). This position has been acknowledged by planners, politicians, academicians, as well as international organizations. The popular UNESCO publication - Learning to Be - and International Labor Organization (I.L.O.) Reports echoed such sentiments and provided a "prescription" for solutions (Faure, 1972; I.L.O., 1972; Simkins, 1972). To escape from the predicaments, the contention is usually that the curriculum, especially at primary level, needs to be more practical-vocational oriented, with emphasis on agriculture, technical and business subjects.

However, neither the source of school graduates' aspirations for urban employment nor the degree of their alienation from rural life ever appears in educational research. Foster (1965) in his widely quoted article "The Vocational School Fallacy" termed the curriculum "strategy" and the above accusations of the school as "fallacious", for they ignore crucial variables that must be taken into account in analyzing the impact of schooling in rural development.

His study in Ghana and similar ones in East Africa have indicated that schooling does not, in a real sense, alienate children from rural life. Their choices of occupation in urban areas, for example, are controlled by external factors which are beyond the control of the school (Court, 1974 ; Kinyanjui, 1979; Foster, 1965; 1978). In reality, the demand for urban employment stems from a remarkably realistic appraisal of occupational opportunities and rewards associated with them.

From the colonial period schooling was primarily associated with enabling individuals to move from subsistence activities to occupations within the European dominated sector. In addition, there was the objective of training a small cadre of individuals with limited education to fill lower level positions in the public sector and in the emerging European dominated sector of the economy - for example, messengers, junior clerks, police constables etc.

Fafunwa, (1973), for example, has suggested that

it is the hiatus between the formal and traditional education that pushes young people out of agriculture and sends them to the big towns and cities to join thousands of unemployed applicants for jobs that do not exist

(Fafunwa, 1973, p. 64).

This gap is created by the fact that schooling acquired a

utilitarian perspective. Going to school is equated with purchasing a better material future (Bude, 1985). The proponents of the "fallacy" theory argue that no amount of vocationalization of the school curriculum will facilitate rural development.

Studies in East Africa on the attitudes and aspirations of primary school graduates indicate that, although graduates appear to aspire to white-collar jobs in urban areas, there is little evidence of actual disenchantment with rural life (Anderson, 1968; Brownstein, 1969; Kinyanjui, 1979; Sifuna, 1984). The evidence shows that the majority of youths who terminate their schooling at the primary level, remain in rural areas to serve their communities. It is also true that those who move to urban centers continue to support their families and invest in rural areas. Studies in Latin America and Asia support this view (Baker, 1989; Robson, 1986).

Primary school graduates who remain in rural areas have been accused of being idle and performing no economically viable tasks to help themselves and develop the society. This view is opposed by the results of Shiundu's (1986) intensive study of primary school graduates in South Nyanza district. He found that the majority of rural primary school

graduates were engaged in productive occupations in the informal sector. It was observed that the school graduates applied many skills acquired from schooling in their occupations. However, the study found that most self-employed primary school graduates left school without a proper grasp of basic skills in numeracy, literacy, and in practical subjects, a condition which limits their performance at work (Shiundu, 1986).

There is no doubt that the problem of "educated" unemployment and rural-urban migration has increased in Kenya (Kenya, Republic of, 1984; 1988). However, there is little evidence that schooling leads to alienation with rural living. Besides, the problem of rural-urban migration cannot be primarily attributed to the school curriculum. Despite the above, there is a desire to strengthen the capacity of primary schooling to impart relevant innovative knowledge. The crucial question is, how can this be undertaken?

Relevant policies in education in most African countries have failed because of the lack of proper links between national policies and strategies for economic development on one hand, and educational policies and the realities of social life, on the other. Most planners have used "national

technical approach" to educational planning to solve broad social and economic problems at the macro level while ignoring the rural environments which support the system as its major source of income. In most cases the policies have been focussed on the urban sector with an assumption that benefits will "trickle" down to reach the rural population (Beeby, 1985; Goldschmidt, 1980; Migot-Adhola, 1980; Psacharopoulos, 1985).

In an attempt to adapt schooling to rural development in Third World countries, several issues and problems have been identified. These include a misunderstanding of the idea of education for rural development, the lack of administrative involvement in school activities, and the socio-economic gap between the rich and the poor. Community involvement in school activities is reduced to providing supplementary funds and assisting in building and maintaining school physical structures (Bude, 1985; Macauley, 1973; Martin, 1984; Thompson, 1984). The government of Tanzania has tried to solve some of the above problems.

In Tanzania attempts have been made to adapt schooling to rural development. Since agriculture is the main occupation of the rural population, most primary schools have

integrated agricultural projects and academic work. Such projects are related to local environments. The language commonly used in these practical activities is Kiswahili, the national language (Macaulay, 1973, p. 3). One useful example is the Kwamsisi model schools in which members of the local communities are actively involved in school activities, and vice versa. The schools have curricula which extend to four areas: literacy and numeracy, citizenship, self-help, and cultural and environment studies (Thompson, 1984, p. 270).

It must be pointed out that these developments occurred under the leadership of Nyerere, whose educational philosophy and attitudes were geared towards rural development. Similar projects have been developed in other Third World countries, particularly in India and in some South American countries (Colclough, 1980; Gounden, 1987; Pardeshi, 1973).

With heavier investments in primary schooling (about 40% of educational budget) coupled with its importance in Kenyan society, the quality of primary schools must be improved to meet the country's needs (Government of Kenya, 1988; 1989. The implication is that questions dealing with both internal and external efficiency of primary schooling must be addressed.

Primary Schooling and Agricultural Productivity

Attempts to determine the impact of schooling on productivity have resulted in many studies. They generally substantiate the basic link between formal education and economic growth and provide a rationale or justification for continued increased expenditures in education in Third World countries (Colclough, 1980; World Bank, 1988).

The assessment the relationship between of quality of education and economic growth in Third World countries is justified by the fact that despite the avowed link between education and economic growth, other kinds of schooling outcomes have been disappointing. Rural areas have generally remained undeveloped, rural-urban migration has increased, and the unemployment problem has become crucial. Formal education has not adequately served the majority of the population, which still struggles with poverty and illiteracy (Coombs, 1985; Kinyanjui, 1979; Fagerlin^d and Saha, Commonwealth Secretariat, 1989).

As mentioned before, investment in primary education in Third World countries is generally considered positively. Improved skills in literacy and numeracy, more positive

attitude towards agriculture and modern agricultural technologies are looked upon as important prerequisites for increasing agricultural productivity.

Several studies have attempted to assess the impact of schooling on agricultural productivity. Generally, two indices have been used in such studies. The first is the adaptation of innovations (the effective use of improved techniques and recommended practices). The second is productivity (the actual farm yield). However, writing on the issue, Ferge concluded that,

the long-lasting chicken-egg controversy, whether the increase of schooling is a preliminary condition or results and consequence of economic growth, is far from being settled. The current evidence seems to point both ways: in some cases more education has a direct positive impact on production, in some others one can speak of economic loss (because of the problem of "educated" unemployed).

(Ferge, 1981, p. 18).

The debate has not stopped researchers and international organizations from providing evidence that investment in primary schooling makes farmers more productive.

Lockheed, Jamison and Lau (1980) summarized eighteen studies conducted in low-income developing countries which correlated formal education with agricultural productivity.

The study included an analysis of 37 sets of farm data that allowed statistical estimation of the effect of education on technical efficiency in the productivity of rice, wheat, and maize. The following variables were included: land area, farm output, family labour, equipment used, the educational level of households, and exposure to extension services (Lockheed et al, 1980, p. 113-115).

The study found that education has a positive effect on farm production. The overall conclusion was that farm productivity increases, on the average, by 6.9 percent as a result of a farmer completing four years of elementary education rather than none (Lockheed et al, 1980, p. 136). The impact of schooling on agricultural productivity seems to be influenced by the ability of educated farmers to use modern agricultural technologies more accurately and their increased ability to manage their farms.

To establish the relationship between schooling and the application of modern agricultural technologies and increased agricultural productivity, Jamison and Lau (1982) surveyed individual farms in Thailand, Korea, and Malaysia. The data set used for the study contained information on education of the farmers, the nature of farm inputs and

outputs, and prices of farm inputs and outputs. The effect of education was estimated on productivity by constructing a production function-statistical relationship between farm output to the level of education (Jamison and Lau, p. 195-222). It was found that there was a positive correlation between education and farm productivity due mainly to increased probability of using chemicals and fertilizers.

A study by Moock (1973, 1976) in the Western Province of Kenya show that managers with more formal education generally obtained higher yields than did managers with less schooling. Studying the output of maize in Vihiga Special Rural Development Program, Moock used the yield of maize as a criterion of productivity. When the yield of maize was related to management, it was found that managers with four or more years of schooling generally obtained higher yields than those with less schooling (Moock, 1973). A manager who has completed four years or more of schooling has "acquired the minimum level of computational, linguistic, and conceptual tools" that are necessary for stimulating insights into small-scale farmers' problems. However, Moock (1976) found that while completion of one to three years of schooling was associated with higher yield for women managers, this does not apply to men managers. This was

attributed to the migration of more able men to urban areas, those left behind being less educated and less able to handle farm management.

A study by Hopcroft (1974) in Kenya related adoption of innovation to various levels of education (grades 2, 3, 4, 5 and above). After measuring the impact of farmers' education on the production of maize, tea and cattle rearing, he found in general that a higher level of education was not associated with an increase in agricultural productivity. However, he concluded that there is evidence that a farmer who has been to school seeks out innovative knowledge and is more aggressive in seeking information from extension workers or agricultural institutions. Besides, such a farmer is likely to use modern agricultural inputs more intensively.

Recent data from Kenya and Burundi suggest that when the educational level of adults in a household is taken into account, the school effect on the use of modern agricultural technologies and increased productivity may be greater (Eisemon and Nyamete, 1989; Eisemon and Schwille, 1989).

Eisemon and Nyamete (1989) sought information on literacy and numeracy skills, and farmers' knowledge of

modern agricultural technologies. Applying statistical analysis, they found that increased productivity in agriculture was generally related to years of schooling and application of modern technologies, for example, frequency of fertilizing the crops. Years of schooling explained about 34 percent of food production, almost as much as fertilizing maize, which explained about 40 percent of food production. The effect of schooling was associated with cognitive skills which tended to make individuals comprehend and adopt principles of "modern" agriculture.

In order to examine the effect of schooling on production and farm output, Eisemon and Schwille (1989) studied 120 farmers in Burundi. Data were obtained from schools as well as from farmers living on adjacent areas. It was found that schooling had a modest relationship to increased output of food crops, schooling does not make farmers better producers of cash crops, and the impact of schooling on food production is highly varied, being positive for some crops and negative for others.

Although many studies show that there is a positive correlation between schooling and agricultural productivity, such findings have been controversial among educators and

policy makers. Using data from India and Brazil, Villaume (1977) constructed a model to assess the contribution of schooling and literacy to agricultural innovation. He found that the effects of schooling and literacy were negligible. Non-formal learning and agricultural extension programs had more impact than formal schooling (Villaume, 1977). A study by Jamison and Moock (1984), in assessing the effect of farmer education on farm efficiency in Nepal, concluded that neither literacy nor measures of agricultural knowledge were highly associated with technological adoption or agricultural output (Jamison and Moock, 1984). A study of rice farmers in Tamil Nadu in India by Kalirajan and Shand (1985) concluded that schooling is not a major factor in efficient farm production; "an illiterate farmer without the training to read and write can understand a modern production technology as well as his educated counterpart" (Kalirajan and Shand, 1985, p. 233).

A more recent study in Burundi found out that schooling has some effect on agricultural productivity. However, it supported Kalirajan's finding that the effect of schooling is smaller than that for measures of knowledge and skills that seem to be acquired from social experience. Schooling also has a modest relationship to increased output of food

crops, but is not highly correlated with agricultural knowledge, comprehension skills and use of modern technologies (Eisemon, 1989).

Such contradictory research findings and statements about whether or not schooling increases agricultural productivity heightens the debate on what role primary schooling can and should play.

Increased school expansion and the current debate on the relationship between schooling and agricultural productivity exposes limitations both in the research methods that have been used and how the issue has been conceptualized. These uncertainties lead to reluctance in using findings from such studies as the basis for major policy changes in education and national development in Third World countries (Fuller, Gorman et al, 1986; Lockheed et al, 1980).

The studies reviewed have a number of factors which limit the scope and applicability of their findings. First, is the difference in sample characteristics. This includes the size and distribution of farms used, types of crops grown and regional characteristics of the farms. Most of the studies were based on individual projects, sponsored by

multinational agencies. The second factor is the specification and measurement of dependent and independent variables. Most of the studies used the value of crop production, which depends on varying prices, as the dependent variable. Differences in the values of farm products may not relate to the amount of schooling. Variation was more pronounced with regard to the educational variables used. The educational level which is associated with agricultural productivity was measured differently in the studies, in some cases simplified to basic numeracy and literacy skills. Third, the studies have tended to reduce the relationship between schooling and agricultural productivity into statistical "jargon". This means that only variables which can be put into statistical testing are used. This excludes, for example, socio-cultural and environmental factors which may affect productivity.

After reviewing studies analyzing the impact of schooling upon farmers' productivity; Colclough, recently commented that,

although the studies are encouraging (there) are ways in which their methodology could be usefully refined in future. In particular, less crude measures of the amount of schooling received are required.

(Colclough, 1985, p. 21).

In general, the literature shows that the studies on schooling and agricultural productivity have concentrated on the uses of literacy, numeracy, and retention of agricultural knowledge as measures of school knowledge and skills in raising agricultural productivity.

The studies have ignored the mechanism through which schooling affects the acquisition of useful agricultural knowledge and general information which might increase agricultural productivity. Such studies provide few insights into strategies for increasing the capacity of primary schools to effectively impart principles of "modern" agriculture and rarely reflect on how schools may influence the application of such skills in agricultural practice.

However, the literature summarized above has thrown some light on whether or not the school exercises a decisive influence upon agricultural productivity. Even though the debate continues, educators now generally accept the view that while curriculum reform might not in itself be able to bring major changes in agricultural development, "appropriate curriculum content can be useful in giving (students) some relevant skills. Also, they might even develop certain dispositions which could help them" (Bacchus, 1987, 152) to

participate actively in the development of rural areas.

The effectiveness and efficiency of schools imparting knowledge and skills needed for agricultural practice is more crucial to the way school graduates may think about and practice agriculture. The school quality therefore should not be ignored when assessing the relationship between schooling and agricultural practice. This study is an attempt to bridge this gap.

CHAPTER TWO

METHODOLOGY AND RESEARCH QUESTIONS

General Statement

This chapter discusses the methods used to explore the teaching of agriculture in Kenyan primary schools and the ways that classroom theory is translated into actual agricultural practice in school plots and in the communities. A descriptive approach was considered the most appropriate method of examining whether or not principles of "modern" agriculture can be taught effectively in primary schools.

Unlike a quantitative evaluation of, for example, school factors that increase crop output or of measures of school effects, the concern was with the mechanism through which schooling may affect how students think about and practice agriculture. Due to the fact that older elementary school children in Kenya are often actively engaged in agricultural practices along with their parents, the potential for short-term transfer of information from school to community is good.

An ethnographic approach was used to examine the teaching of agriculture in schools and to determine how

agricultural instruction may enhance students' capacities for agricultural practice. The concern was with classroom interaction and its linkage to agricultural practice in school and in the community. This approach permitted a systematic linking of micro and macro level variables, while maintaining a holistic perspective on the context of education (Bogdan and Taylor, 1972; Cleghorn, 1985; Spindler, 1982; Wiersma, 1986).

According to Wiersma (1986)

ethnographic research proceeds from the position that hypotheses may emerge as data collection occurs. The observer attempts to suspend any preconceived ideas or notions ... (and) wishes to concentrate on the entire context and thus maintain a holistic view, rather than focusing on bits and pieces. The ethnographic researcher attempts to maintain a perspective on the totality of the situation

(p. 236).

Several procedures were used in data collection to ensure comprehensiveness of data collection and treatment. The procedures included: analysis of relevant official government and Ministry of Education documents, administering of structured questionnaires, observations, and conducting informal interviews.

This study began with a broad question, which provided the direction of the research and gave a point of departure:

can principles of "modern" agriculture be taught effectively in primary schools?

As the data collection proceeded, other sub-questions emerged:

- a) To what extent do school plots act as a form of extension to community agricultural practices, systematically or otherwise?
- b) What is the relationship between classroom theory and actual practice as exemplified in the treatment of school plots?

The study required several months of extensive research before interpretations could be made. The field work was conducted over a period of seven months, from March to October 1989, in Kiambu and Kwale Districts. Background details pertinent to the two regions are discussed in the next chapter.

The Setting

Kenya has eight provinces with very different environmental conditions. Agriculture is the main occupation of about 85% of the population and is the backbone of the

country's economy. Since the agriculture curriculum, like the rest of the curriculum is determined centrally, it is supposed to cater for all of Kenya's environmental conditions. Agricultural instruction is expected to help in modifying peasant agriculture. In order to obtain information that would shed light on this issue, the research called for data collection in two contrasting districts. To this end, two schools in each of the districts - Kiambu and Kwale - were selected.

Selection of The Schools

There were two phases in the selection of the schools for the study. In the first phase, a total of twenty primary schools, ten from each district, were selected for general survey on the basis of performance in the previous years' (1987-1988) Kenya Certificate of Primary Examination (KCPE). The statistics were obtained from the District Education office. Perusal of the results showed that schools which had an overall good performance in the KCPE also did well in the agriculture-science paper. The first ten schools in the list were thus picked for initial survey, on the assumption that high performance in the national examination tend to be related to teaching effectiveness. As other measures of teaching effectiveness are not available without extensive

study, performance in the national examination as a criterion for selection was deemed reasonable. These schools were visited during the months of April - May to ascertain details about teachers, teaching resources, organization and use of school plots (gardens).

The second phase involved the selection of four schools, two from each district, for focused study. Since there were no major obvious differences between the school plots in each district in terms of organization, size and usage, the final decision as to school selection was made on the basis of school size. Schools which were average in size (800 or more) were identified and a random selection of four made, two from each district (Table 1).

School A in Kiambu had an enrolment of 1581 (787 boys and 794 girls) and four streams at each grade levels, with an average enrolment of 40 students per class. School B had an enrolment of 1050 students (486 boys and 564 girls), with three streams in each grade, and about 40 students per class. In Kwale, school C had an enrolment of 810 students (410 boys and 400 girls), with three streams of 35 students per class. School D had 822 students (416 boys and 406 girls) with three streams at each grade.

Table 1

Number of Students and Total Trained Teachers
in the Four school

| District | School | # Stds | B | G | # Tchrs. | # Trained |
|----------|--------|--------|-----|-----|----------|-----------|
| Kiambu | A | 1581 | 787 | 794 | 39 | 37 |
| | B | 1050 | 486 | 564 | 33 | 31 |
| Kwale | C | 810 | 410 | 400 | 19 | 14 |
| | D | 822 | 416 | 406 | 16 | 9 |

Stds = Students enrolment, B = Boys, G = Girls

Teachers = No of Teachers

Trained = No of Trained Teachers.

Table II shows the level of training for teachers in the four schools. Among the staff of 39 in school A (Kiambu), 18 (46.2%) were men. Teaching experience averaged 10 years. Thirty seven (95%) teachers were trained. School B had 33 teachers, 16 (48.5%) of whom were men. Average years of teaching was nine. Thirty one (93%) teachers were trained. The staff of school C (Kwale) numbered 19, and 8 (42%) were

men. Teaching experience averaged 10 years. Fourteen (73%) teachers were trained. In school D, among the staff of 16,

Table II

Level of Training for Teachers by Gender

| Schools | <u>Kiambu</u> | | | | <u>Kwale</u> | | | |
|-----------|---------------|----|----|----|--------------|----|---|----|
| | A | | B | | C | | D | |
| | M | F | M | F | M | F | M | F |
| SI | 1 | - | - | - | - | - | 1 | - |
| PI | 10 | 10 | 14 | 10 | 4 | 7 | 2 | 5 |
| PII | 6 | 9 | 2 | 5 | 1 | 1 | - | - |
| PIII | - | 1 | - | 1 | - | 1 | - | 1 |
| Untrained | 1 | 1 | - | 2 | 3 | 2 | 2 | 5 |
| Total | 18 | 21 | 16 | 17 | 8 | 11 | 5 | 11 |

Total No. of Teachers Trained ... 91 (51 Female Teachers)

Total No. of Untrained 16 (10 " ")

Grand Total 107

SI = Senior primary Teacher certificate, usually A-level certificate holders.

PI = Primary Teacher I, O-level certificate holder with at least 1st and 2nd Division pass.

PII = Primary teacher II, O-level equivalent with at

least second Division pass

PIII = Primary Teacher III, O-level certificate with at least a pass in Third Division.

Untrained = Those who have not undergone a two years teaching training course.

NB. 1. Salary scale is different for each training level

2. Primary school teachers are trained for two years to teach all of the 16 subjects offered in primary schools, in any part of the country.

five (31%) were men. Teaching experience averaged 8 years. Nine (56%) teachers were trained.

SI is the highest level of training. There were more female teachers than male. Only 5.6 per cent of teachers were untrained in schools A and B compared to 34.3 per cent in schools C and D.

Selection of Grade levels for Study

In addition to the above-mentioned procedures for school selection, two grade levels in each school were selected in order to focus the topic of this research more precisely. Standards VI and VIII were selected.

Standard VI was selected as it is an important level to study because it is an intermediary class in upper primary cycle (Agricultural instruction starts in standard IV, the beginning of upper primary which ends in standard VIII). At this stage students have already had two years of agricultural education and are not facing a national examination (national examination years in Kenya are noted for placing enormous pressure on teachers and students). It was thought that because of the lack of examination pressure, pupils would spend more time in school gardens (see Primary school Agriculture Syllabus), rather than in class for examination drilling.

Since Standard VIII is the last year of the primary educational cycle, it was important to observe how agriculture is taught to prospective school graduates (about 70% do not proceed to secondary schools). This is the stage at which it is assumed that the primary agriculture course has achieved its objectives; students are prepared for the end of primary national examination - the Kenya Certificate of Primary Examination (KCPE)-, and for practical agriculture if they decide to take up farming.

In each of the four schools, one stream in Standard VI and one in Standard VIII was then selected for the study. This was done through consultation with science/agriculture teachers as it was essential to this study to have the cooperation of the teachers.

Random sampling was used to select 25 per cent of students from the two classes in each school, with equal number of boys and girls, for interviews. A total of 80 students (40 boys and 40 girls) were interviewed.

Additional information on agricultural education was also gathered from a sample of parents who were farmers living in the schools' catchment areas. A total of 40 farmers, 20 from each district, were interviewed. This represents fifty per cent of parents of the interviewed students.

Procedures of Data Collection

In line with the ethnographic approach, no specific hypotheses were established at the outset and, as mentioned earlier, the study began with a broad general question which helped to provide the direction of the research and to give a point of departure. To reiterate, the intention was to

explore how agriculture is taught in primary schools and how such instruction may enhance agricultural practice and development.

In this research, the procedures of data collection included: analysis of relevant official government and Ministry of Education documents, administration of questionnaires, observation, and conducting informal interviews.

1) Documentary Analysis

The following documents were analyzed: The Phelps-Stoke Commissions Reports (1924 -1925); The Beecher Reports (1949); The Ominde Commission (1964); The Primary school Agricultural Syllabus (1986-87); The 8-4-4 System of Education (1985); and The Education and Manpower Training for the Next Decade and Beyond (Sessional Paper NO. 6) Report (1988). The documents provided data on the development of agricultural education in Kenya - its policy, structure, and how it has been integrated into primary school curriculum.

2) Structured Questionnaires

To get demographic data, a set of structured questions (Appendix V) were administered to all science/agriculture

teachers in the four schools. The questionnaires were distributed to the teachers in their staffrooms. They were given twenty to thirty minutes to respond to the questions. The questionnaires were filled in the presence of the researcher. This supplemented data collected from informal interviews.

3) Observation

Observations were undertaken in the classrooms, in the school plots, and in the gardens/farms in the community during agriculture lessons and practice. The observations were done by the principal researcher or research assistant or both. A total of 156 lessons were observed in the schools. Of these thirty-two were practical lessons conducted on school plots. However students, particularly in schools A and B, participated in agricultural activities many times outside the laid down agricultural periods i.e. during recess. The focus was on how teachers teach about agriculture (methods of teaching, language use, use of textbooks, notes given); how classroom theory relates to actual agricultural practice in the school plots; how students apply school knowledge in actual practice, how teachers and students handle "new" agricultural technologies; and how teachers relate agricultural instruction to local

community agricultural practices. Lessons were tape-recorded and notes taken.

Observation was also done in the school gardens to examine how they were organized, equipped and used; how practical activities related to classroom instruction; what kind of agricultural technologies were used in the school plots, and how agricultural activities in the plots were linked to community agricultural practices. The participation of students in the school gardens and in agricultural projects outside school was closely observed and recorded. This also applied to teachers' roles. Attention was also paid to gender issues, in terms of allocation of tasks in the gardens or agricultural projects; to opportunities parents offer to their children and how they are assisted to participate in agricultural projects or tasks.

Observational data were supplemented with field notes and audio tape-recording of selected lessons. In this way the researcher was able to, retrieve verbatim samples of classroom dialogue, and to validate observation.

4) Interviews

Both formal and informal interviews with a) teachers, b) students, and c) local farmers were conducted.

a) Teachers were interviewed in the 5th month of the field work. This was restricted to science/agriculture teachers in the four schools. The group (panel) interview approach was used. Twenty-two teachers in school A, 19 in school B, 12 in school C, and 9 in school D ($N = 62$) were engaged in an informal interview in the form of discussion using a list of questions as guidelines (Appendix II). This was done to give teachers an opportunity to discuss the primary school agricultural education and other related issues. The discussion centered on the assessment of the agriculture syllabus, the problems teachers face, and the changes they would like to see in primary school agriculture. The discussions were tape-recorded and notes were taken.

b) The sampled standard VI and VIII students, 40 from each district ($N = 80$), were interviewed directly by the researcher. This was done in the 6th month of data collection. In this case questions (Appendix III) were asked and answers recorded during interviews. Students were interviewed to get additional data on how they learn

agriculture, problems they face, agricultural projects, opportunities given by teachers and parents, and their aspirations.

c) In order to examine the school-community connection, 40 farmers, 20 from each district, were interviewed directly. Also in this case, questions (Appendix IV) were asked and answers recorded during interviews. Questions centered around parents' awareness of school agricultural projects, opportunities offered to the children, and the relationship between school agriculture and community farming.

Data from daily comprehensive field notes, transcripts from tape-recorded lessons, together with interviews, questionnaires and relevant documents were triangulated and formed the basis of data analysis and interpretation.

Data Analysis

Since this was an ethnographic study, the inductive approach was used in data collection and analysis (Anderson, 1988; Bogdan and Biklen, 1982; Miles and Huberman, 1984; Wiersma, 1986). Data analysis was an on-going process from

the beginning to the end of field work. This means that at the end of each day, field-notes (both descriptive and reflective observations) were manually grouped and summarized into four major categories: 1) The major events observed, 2) new issues arising which need further focus, 3) issues not directly related to agricultural instruction, and 4) a summary of what was learned.

The summaries assisted in developing specific analytical questions, interview protocols, and planning for further data collection. The tape-recorded lessons were transcribed verbatim and organized according to the nature of the lessons. Samples of dialogue during agricultural instruction became part of the report. Since primary school agricultural education was/is expected to achieve set objectives, the six objectives of primary school agriculture (see Chapter III) were used as a framework for content analysis of transcribed notes and relevant documents. The data were examined qualitatively to establish whether they reflected the objectives and the realities of agricultural instruction in primary schools.

Data from interviews and structured questionnaires were treated statistically. Primary descriptive statistics were

used to organize the data and, where appropriate, analyzed quantitatively. The data were tallied into frequencies, converted to percentages when necessary, and presented in tabular form.

CHAPTER THREE

DEVELOPMENT OF AGRICULTURAL EDUCATION AND ITS INCLUSION IN THE PRIMARY SCHOOL CURRICULUM

The development of Agricultural education in Kenya dates back to 1846 when the first mission school was established at Rabai in Kwale District, Coast Province by the Church Missionary Society (Raju, 1973; Sheffield, 1971). The primary objective was to use the school as an agent of gaining converts, although later it was used to impart basic agricultural knowledge to the Africans to improve food supply to the mission. Based on experience from other parts of the world, it was clear to the missionaries that African education had to be related to the local environment. Thus, the need to adapt schooling to the conditions under which the majority of Africans lived was crucial.

However, this adaptation approach is not unique to western systems of education. In Kenya, like in other African countries, indigenous education was primarily for immediate induction into the society and preparation for adulthood. Learning by doing was the mode of teaching. Children learned and participated in activities like farming, fishing, carving, weaving etc. depending on the environment

in which they were brought up. In general, education was for character training and economic orientation (Fafunwa, 1973; Kenyatta, 1976; Occitti, 1973). With the introduction of schooling, vocational education was formalized and regarded as an important aspect of development in Kenya.

This chapter examines the development of Agricultural Education, in retrospect, and how it has been incorporated into the primary school curriculum in Kenya.

Agriculture Education in Kenya - A Retrospect

The idea of adapting African schooling to the rural environment originated in the educational practices and experiences gained for Blacks in the Southern and Western United States. The idea was pioneered by a white American philanthropist, Samuel Armstrong, who founded the Hampton Institute. After the end of the American Civil War in 1865 there was a strong move to expand educational opportunities for Blacks. The philanthropists believed that Black education must be structured to develop rural areas, by enabling the people to acquire practical-vocational skills. The "adaptation" theory, therefore, became associated with

"relevant" education for the Blacks (Du Bois, 1903; King, 1971; Washington, 1965).

The adaptation approach in education was popularized by Thomas Jesse Jones, who had conducted studies on the theory and practice of the model in the Southern United States and, who later played a major role in transferring the theory to Black Africa.

The concept of teaching agriculture in African primary schools emerged primarily in mission schools in the second half of the nineteenth century. In this period the few schools which were established for Africans sought to impart rudimentary knowledge in reading, writing and religious ideas to win Africans to a Christian way of life. Although agriculture education was introduced, it did not become formalized until Kenya was declared a British colony in 1920. This followed the massive alienation of land by the European settlers and increased demand for African labor. The colonial government, missions and settlers were ready to agree that African schools must be different from those of Whites and Asians. Therefore, they sought educational models which they hoped would meet the increased demand and discourage Africans from drifting to emerging Urban centers.

The first World Mission conference in 1910 recommended a work-oriented education, on the basis of the experience gained in the United States, as being suitable for Africa. The concept was echoed by the Phelps-Stoke Commission Report on Education in Africa which was chaired by Thomas J. Jones. The commission was established to report on the condition of education in Africa, with particular reference to educational policy and practice which would help the majority of Africans in rural areas (King, 1971; Lewis, 1962). This report urged the adaptation of education to the needs of the people as the first requisite of school activities in African schools. Special attention was to be devoted to the teaching of Agriculture due to the fact that African economy was mainly agricultural. The report stated, among other things, that:

... it is imperative that schools shall cease to give the impression that knowledge of the three R's and of the subjects usually in the curriculum is of more importance than agricultural knowledge

(Lewis, 1962, p. 92).

Agriculture was to be incorporated into the school mainstream. Before the adaptation concept could be put into practice in Kenya, a second Phelps-Stoke Commission Report (Education in East Africa: A Case Study of East, Central and Southern Africa) was published in 1924. The report pointed

out that agricultural instruction must be strengthened in primary schools for Africans. The first step towards agriculture instruction as an educational aim was the development of a real appreciation of its importance in Kenya. The specific objectives for agricultural instruction were identified as:

1. To help pupils appreciate agriculture
2. To teach the science of agriculture
3. To teach economics of agriculture
4. To teach soil, crop, and labor conservation.
5. To teach the value of soil to man
6. To teach forestry

(Jones, 1925, p. 39).

In 1925 the first African Jeanes school, modelled after the Jeanes schools in the United States, was built in Kabete near Nairobi. The school was to train Africans in practical aspects of development - agriculture included, so that they would teach others what they had learned. The two year program involved training African teachers and their wives simultaneously. Both were allocated a plot of land on which they were to use improved methods of farming. Students and teachers were involved in observations and experimentation on an experimental farm on which an African farmer cultivated land in the traditional manner. Instruction was offered mainly in local languages, for there was a feeling that innovative skills in agriculture could not be effectively imparted without adequate use of indigenous languages. After

the completion of the course, trainees were expected to return to their local areas and put into practice what they learned. They were required to set their own plots as demonstration farms and instruct others using primary schools as a base (Heyman, 1970; Jones, 1925).

In developing an educational policy in Black Africa the British and other colonial governments were deeply influenced by the two Phelps-Stokes Reports. After studying the reports, the Advisory Committee on Educational Policy in British Tropical Africa produced a memorandum which established the framework for an educational policy for Africans (Great Britain, 1925). The memorandum reiterated the necessity of relating schooling to the African way of life. The school was expected to help in maintaining "good" elements of traditional society and to integrate Africans into a modern - market oriented - economy. The new educational policy for Black Africa was intended to enhance community - and production-oriented schooling, a concept which had already been tried in the United States.

The responsibility of the Advisory Committee on Educational Policy in Africa and the Educational Commissions mentioned above was to do away with educational aims which

were obviously antagonistic to the best interest of the Africans and the colonies. In this, the commissions managed to bring harmony among governments, missions and settlers who claimed to be committed to the development of African communities.

With the determination to relate schooling to the local communities in Kenya, the British government through the Colonial office appointed the Beecher Commission in 1949 to re-examine the scope, content and methods of African education in Kenya (Colonial Office, 1949). The report published as "The Beecher Report: African Education in Kenya" advised not only on the administration of primary education, but on a crucial issue of educating African children. It found an almost complete disappearance of a technical emphasis and practical training in primary schools. The Beecher Report, therefore, re-emphasized agricultural instruction and urged that more should be done to make it more effective for the benefit of the students and their communities (Colonial Office, 1949; King, 1971; Stabler, 1969). The report influenced the pace and development of the quality of African education upto independence.

The Beecher report was followed by the Swynnerton Plan

(1954) which was commissioned to look into African Agricultural Policy and Development (Colonial Office, 1955). Among other things, the plan called for a proper coordination between the Ministry of Agriculture and the Ministry of Education. It called for the increase of school quality to make schooling impart positive attitudes and skills necessary for self-employment. This was to make students aware of the problems of the country and to realize the interdependence between agriculture and the country's development. Swynnerton's recommendations were almost entirely adopted. The agriculture syllabus in primary schools was re-structured. It remained an important subject, both as a theoretical topic under general science and as a separate practical subject. Each school was to have one trained agricultural instructor, and each class was to have a demonstration plot. In addition, each school was required to start a Young Farmers Club (Fuggles-Couchman, 1956).

With the general agreement on the "adaptation" theory, it was not difficult to find a common ground on pedagogy in African schools. Although the above plan was comprehensive, its actual implementation was not efficient. The history of agricultural education indicates that the program was faced with basic dilemmas. The problems included a shortage of

trained teachers, a lack of instructional resources and inadequate supervision. The distribution of teaching guides and books in African schools remained uncoordinated (King, 1971). In short, the gap between official policy and actual implementation was evident. There was hardly enough time and personnel to plan and effectively implement agricultural education programs in schools. More crucial, was the resentment by Africans of such an educational program.

The immediate response of Africans was hostility and rejection of the "adaptation" theory and of agricultural education. The objectives and the implementation of the program were criticized and rejected by Africans because of the racial undertones and the realization that such education was preparing them for subordinate roles in society. For example, the first Church Missionary Society school for Africans at Rabai, on the Coast, experienced a split between African and White teachers over the issue of practical instruction. Differing educational philosophies were the bone of contention (Anderson, 1970).

Practical education was supported by settlers, missionaries and colonial administrators because it made Africans efficient laborers. To the Africans, the approach

of adapting education to the rural environment was seen as an attempt to keep Africans in an inferior position and to put them out of active politics. Academic education was demanded by Africans because it was seen as a tool for socio-economic and political development (Anderson, 1970; Raju, 1973; Sheffield, 1971). Increased opposition to segregated education and demand for academic subjects as in conventional European schools emerged when Africans started establishing their own schools, referred to as "African Independent Schools," a move which was triggered by the Kikuyu in Central Province where land alienation had been intense and a major source of conflict.

The significance of the Phelps-Stokes Commissions and other Reports on African education was not contained in new ideas or concepts. Rather,

the real innovation was the methodological substantiation furnished to support the use of the primary school as an instrument of rural development

(Bude, 1985, p. 63).

The success of agricultural instruction in Jeanes School's, for example, depended on the use of school plots as demonstration farms. Students, with the help of teachers, conducted experiments and applied both indigenous and western agricultural practices. This gave the students the

opportunity to determine what aspect of "new" principles of agriculture could be adapted into their environment.

In addition, the implementation of "adaptation" theory had implications for classroom teaching. The agricultural programs were designed not only to improve classroom instruction by enriching it with discussion and participation, but also by giving teachers and students the opportunity to visit other villages to demonstrate improved farming techniques.

Whether or not agricultural education, with its adaptation principle, was irrelevant was not the center of tension in African schools. The controversial issue was the claim, by the Europeans, that Africans needed "special" education, different from that offered to Europeans and Asians - a practically oriented education for Africans and an academically-oriented education for whites and Asians.

Throughout the long history of experimentation and adaptation in education, agriculture has been a highly controversial subject. Despite the emphasis, it was not a fully accepted and well established subject. Towards independence, it was clear that agricultural education would

not be tolerated any longer. However, a crucial lesson learned from this history is that when educational planning disregards the full actuality of socio-economic conditions and ignores the peoples' understanding of the purpose of education, that planning is likely to be ineffective.

Independence and Primary Educational Reform

At independence in 1963 about 50 per cent of the primary school-age group was attending school in Kenya, and there was a growing pressure to increase the proportion and expand education even further. The government became committed to increase not only the number of educated Kenyans, but also the quality of education offered (King, 1971; Raju, 1973; Sheffield, 1971). The new leadership attacked the colonial government and the missionaries for offering a segregated and low quality education to Africans, education which was seen as irrelevant to an independent country striving for socio-economic and political development. The Kenyan African National Union (KANU), the ruling party, stressed the government's commitment to the idea of education being geared to prepare Kenya's youth to build an independent, self-reliant and truly African nation (Kenya Government, 1964). Thus, within three months of independence the Kenya government appointed the first education commission, under

the chairmanship of Ominde, to survey the existing educational resources and advise the government on how to shape the future of human resource development in the country. The report of the commission was published as Ominde Commission (Education Commission Report) (Kenya Government, 1964).

With the recommendation of the commission, the government adopted new educational policies which were first aimed at decolonizing education, and second, at providing a skilled labor force. Secondary, higher and technical education were considered priority areas because the country lacked skilled personnel. Although the importance of primary education was recognized, its expansion was not regarded as a priority (Kenya Government, 1964). The idea was re-emphasized by the ruling party document, African Socialism and its Application to Planning in Kenya, which made it clear that

In Kenya's stage of development, education is much more an economic than a social service. It is our principal means for relieving the shortage of domestic skilled manpower and equalizing economic opportunities among citizens The immediate objectives in education are to expand secondary level facilities

(Kenya Government, 1964, p. 40).

The Ominde Commission, having a wider mandate of advising the government, established the following five crucial policy statements on education.

1. Education must bring national unity as opposed to its earlier segregating character.
2. Education must bring responsibility and opportunity for all.
3. Education is a function of the secular government and can no longer be a function of the church.
4. Education is a vital factor in the economic development of the nation.
5. Education must recapture the cultural values of the past whereas previously it tended to destroy them

(Kenya Government, 1964, p. 25).

For primary education, the Commission recommended the reorganization of the primary school curriculum. A new "strategy" known as the "New Primary Approach" was introduced. This was an attempt to combine a child-oriented method of teaching, with new methods of teaching Science and Mathematics - subjects which were considered crucial to human resource development. The new approach was to enable teachers to create a classroom climate of activity, curiosity and exploration, replacing the rote-style learning that accompanied a teacher-centered approach. Agriculture was thus abandoned as a separate subject and incorporated into general science (Kenya Government, 1964, p. 58-59).

Apart from the incorporation of agriculture into science, another change was the scrapping of the competitive "Common Entrance Examinations" taken by Africans at grade four as a selective mechanism for intermediate primary - grades 5 to 8. This examination had kept more than 85 per cent of African children from obtaining a higher primary education. Thus, primary schooling was structured to last seven years and a new examination - Certificate of Primary examination (CPE) introduced. At this time English officially became the main medium of instruction. Kiswahili and indigenous languages remained as subjects in the curriculum. They were not tested in the national examination and this reduced their importance, giving way to their informal replacement in the school time-table by extra periods of English, Mathematics or Science (Sifuna, 1986; Stabler, 1969).

The need for African personnel, mainly in the public sector, offered employment opportunities to those with academic certificate. This utilitarian perspective of schooling, acquired during the colonial period, increased the faith that both parents and students had on schooling as an avenue to get white color jobs. As a result there was an

increase of educational demand and expansion at all levels, a trend which has continued to this day. For example, at the primary level enrollment has increased from 891,000 students in 1963 to 5,500,000 in 1989 (a six fold increase) (Eshiwani, 1986; Kenya Government, 1988).

By the 1970's the strong faith in schooling as an escape from poverty was dwindling, unemployment of school graduates and rural-urban migration were increasing. Directly or indirectly, the education system oriented young people towards employment in urban areas rather than towards the development of rural areas. Because of scarcity of opportunities for wage employment in rural areas, many school graduates felt that their schooling was wasted if they remained there. In general, life in rural areas became associated with illiteracy and "backwardness". At the same time, the education system was accused of alienating the youth from their homes (Kenya Government, 1976, 1981).

With the increase of public out-cry over unemployment, the International Labor Organization carried out a survey on the issue and made various recommendations (I.L.O., 1972). It recommended, among other things, the re-structuring of the school system in the country to incorporate aspects of

vocational education. The government realized that educational policies needed to be re-defined to tie education with development of the country as a whole. The support of development of the agricultural sector was again seen as basic to this endeavor.

Thus the major task facing the government was the development of rural areas, a major component of which entailed the fostering of more positive attitudes towards the agricultural sector. Adaptation of education to national needs became mandatory. The government therefore appointed the National Committee of Educational Objectives and Policies (NCEOP) in 1976. The committee pointed out that schooling was not linked to rural life, thus school graduates were not prepared to participate effectively in the development of rural areas. The report recommended that the education structure and curricula be changed to meet the needs of the nation, particularly to impart practical skills which would make school graduates more productive in their home communities (Kenya Government, 1976).

The problems of "educated" unemployment and rural-urban migration increased in the 1980s despite the government's attempt to re-structure the education system. Therefore, in

1981 the government appointed the Presidential Working Party on the Second University in Kenya. The working party, whose terms of reference were to examine the possibility of establishing a second national university, addressed itself as well to the re-structuring of the education system as a whole. The committee recommended a change from 7 years of primary, 4 years of secondary, 2 years of High school, and 3 years of university education to 8 years primary, 4 years secondary and 4 years university - what is now known as 8-4-4 system of education. The introduction of a vocationally oriented curriculum was also recommended (Kenya Government, 1981). The recommendations were implemented in 1985.

The 8-4-4 system aims at integrating the education of individuals with the needs of the local environment and equipping them with appropriate skills and attitudes for active participation in the development of the society. In this way rural development is to be stimulated. As mentioned before, apart from doing away with two years of high school, the system contains a heavier practical component at all levels than previously was the case. Primary education is considered particularly important in the new education system, because a majority (about 60%) of students terminate their education at this level. The primary curriculum is

based on the following broad principles:

1. improving its quality, content and relevance to cater for the majority of the children for whom primary education is terminal;
2. making the eight-year primary education available to all primary school children;
3. diversifying primary education in order to enhance competence in a variety of development tasks

(Kenya Government, 1984, p. 4).

Since the government has determined that agriculture will continue, for the foreseeable future, to be the mainstay of the country's economy and the occupation of 85% of the population, it has been restored as a separate subject in the primary school curriculum. It is now a compulsory, examinable subject. The teaching of agriculture is now seen as a vital strategy for rural development: for improving peasant farming, for increasing food production, for creating employment, for earning foreign exchange and ultimately for promoting national development.

The Content of Agricultural Curriculum

The content of the primary school agricultural curriculum and its relationship to community agricultural practices are fundamental to a study of students'

understanding and effective use of the principles of modern agriculture. These matters are also important for understanding the way in which educational reform is translated into precise educational objectives (See Appendix I for Objectives of Primary education in Kenya).

As already noted, the primary school curriculum was revised to reflect the fact that primary schooling will continue to be the terminal stage of schooling for many children, particularly those living in rural areas. Apart from the stress on practical subjects, languages (English, Kiswahili and Mother Tongues), Mathematics and Science and agriculture subjects are now regarded as basic subjects. The importance attached to science instruction in Kenyan primary schools is evidenced by the fact that 20 per cent of the school time-table is devoted to lessons in Agriculture, Home Science, and Science (Cleghorn and Abagi, 1989; Jomo Kenyatta Foundation, 1987).

Examination of the Primary School Syllabus (1987) and the 8-4-4 System of Education (1985) documents indicate that the primary school agricultural course was designed for upper primary classes from Standard IV to VIII. As in other subjects, the agriculture curriculum is developed centrally,

for all schools in the country, by the Kenya Institute of Education (K.I.E.), which is under the umbrella of the Ministry of Education. It is vocational and practically oriented in order to develop skills in self-reliance, self-employment, and to prepare children, at this cycle of education, for further education, training and employment (Kenya Government, 1988). Specifically, the objectives of the Kenyan primary school agricultural syllabus are:

1. To demonstrate through practical experiences that agriculture is a profitable and honorable occupation.
2. To create awareness of the importance of agriculture in daily life of various communities and Kenya as a whole.
3. To assist the pupils to practically acquire agricultural knowledge and skills which are relevant and useful to their lives.
4. To stimulate genuine interest and develop positive attitudes leading towards active participation in agriculture.
5. To ensure that the schools take an active part in rural development by integrating agricultural activities in the school curriculum.
6. To develop self-reliance, resourcefulness, problem solving ability and occupational outlook of African agriculture

(Jomo Kenyatta Foundation, 1987, p. 9).

A total of 16 subjects are offered at the primary level of education. Agriculture is taught three times a week, for

35 minutes each period, one being a double period, from Standards IV to VIII. This can be compared to other core subjects taught in standard VIII (Table III): English with seven periods and one being a library period; Kiswahili four periods; Mathematics six, Home science four, one double period; and Science three periods with one double period.

Table III.

Subject Time Allocation

| | <u>Std. 1-3</u> | | <u>Std. 4-5</u> | | <u>Std. 6-8</u> | |
|------------------|-----------------|-------------|-----------------|-------------|-----------------|-------------|
| | <u>P.</u> | <u>Min.</u> | <u>P.</u> | <u>Min.</u> | <u>P.</u> | <u>Min.</u> |
| 1. Agriculture | - | | 3 of 35 * | | 3 of 35 * | |
| 2. Arts & Crafts | 3 of 30 | | 4 of 35 ** | | 3 of 35 ** | |
| 3. English | 5 of 30 | | 5 of 35 + | | 7 of 35 + | |
| 4. Home Science | - | | 3 of 35 * | | 4 of 35 ** | |
| 5. Kiswahili | 5 of 30 | | 4 of 35 | | 4 of 35 | |
| 6. Mathematics | 5 of 30 | | 7 of 35 | | 6 of 35 | |
| 7. Science | 3 of 30 | | 3 of 35 * | | 3 of 35 * | |
| 8. G.H.C. # | 2 of 30 | | 4 of 35 | | 4 of 35 | |
| 9. Religious ed. | 4 of 30 | | 3 of 35 | | 3 of 35 | |
| 10. Business ed. | - | | - | | 3 of 35 | |

= Geography, History and Civics (a combined subject).

* = one double period. ** = two double periods.

*** = library

The content of primary school agriculture education varies in detail from the lower to upper levels. The topics are more general in standards IV and V, but become more specific at standard VI through VIII. They range from land mapping, agricultural production, agricultural services to basic agricultural economics.

Table IV shows the major units covered in Standards VI and VIII. Seven major units, with a total of 27 topics, are listed for standard VI. The same number of units are listed for Standard VIII with 21 sub-topics (See Appendix VII for details of topics in each class).

The syllabus for Kenya Primary schools (1987-88) proposes specific guidelines to help teachers organize and teach agriculture (For details of Guidelines see Appendix VI). Teachers who handle agriculture are expected to be familiar with local environmental changes in their school communities and when such changes occur. Teachers also should, as much as possible, see that they relate the school agricultural activities with those being carried in the community. For example, weeding when the local community is weeding their crops.

Table IV

Agricultural Units for Standards VI and VIII

| <u>Units Std. VI</u> | <u>Units Std. VIII</u> |
|----------------------------|---|
| 1. Soil Erosion | 1. Farm Tools and Equipment |
| 2. Farm Structure | 2. Poultry Keeping |
| 3. Animal Breeds | 3. Rabbit Keeping |
| 4. Animal Management | 4. Bee Keeping |
| 5. Farm labor | 5. Agricultural Resources and Services |
| 6. Farm Equipment | 6. Economic Factors Affecting Agricultural Production |
| 7. Farm Hygiene and Safety | 7. Employment opportunities in Agriculture |

Students are expected to participate actively during agricultural instruction both in class and in the school garden. They are expected to have agricultural projects at home, with crops and animals found in their locality. It is the work in these plots which should be evaluated to show the

extent to which school agricultural instruction has enhanced students' ability in the practice of agriculture.

Since the curriculum is developed centrally and students prepared for the same national examination (Kenya Certificate of Primary Examination - K.C.P.E.), teachers are expected to adhere to the syllabus without much flexibility. They are expected to present lessons formally in classrooms, motivating students as much as possible. In class lessons are followed by demonstrations in the school gardens. The recommended agricultural books have to be used. The books are, among others, Kenya Institute of Education (1987), Agriculture for Primary Schools Series: Books 4, 5, 6, 7 and 8. Nairobi: K.I.E.; Migwi and Moss (1985), Primary School Agricultural Projects - Agricultural Series. Nairobi: McMillan Publishers; Patel and Vishista (1987). Learning Science and Agriculture in Primary Schools: Books. 4, 5, 6, 7 and 8. Nairobi: Mwalimu Publishers. (There have been several books on agriculture in bookstores since the re-introduction of the subject.).

Agriculture is to be taught both in theory (in the class) and in practice (in school gardens/plots). Work in school gardens and in agricultural projects at home becomes

an integral part of instruction. The gardens are supposed to have three major parts: a) demonstration plots kept aside for experiments which are designed to show the best agricultural methods and the effects of neglecting them, for example "use or lack of use of pesticides, plots with varying amount of manures/fertilizers," b) museums as a section for wide range of crops grown locally and nationally. This is to give students the opportunity of seeing as "many crops as possible especially the major cash crops and perennials," and c) pupils' plots for projects "used for real food production and not for experiments." Contrary to the previous practice where the school garden tended to be used as a place for punishment, the garden "should be looked upon as a place of learning, a laboratory to carry out experiments, and a resource for ideas" (Jomo Kenyatta Foundation, 1987, p. 4-5).

The main justification for offering agriculture in primary schools relates to the practical consequences of imparting basic principles of innovative agriculture. Whether or not the primary school agricultural curriculum meets this aim, depends on how various communities in Kenya have adapted to development in general and agricultural development in particular. The next section examines this issue in Kiambu and Kwale Districts.

Adaptation to Development in Kiambu and
Kwale Districts

In the last four decades, Kiambu and Kwale Districts have witnessed radical changes both in education and in development in general. And while the focus of literature on these changes has largely been centered on the history and the spread of a the Western way of life, and the challenges it poses (Kenyatta, 1978, Muruiki, 1974; Mambo, 1980; Salim, 1973), less has been published on factors which explain the disparity between the two regions. Historical and anthropological evidence exists which indicate that various elements underlie developmental trends in the two districts. These include socio-cultural values, political and environmental factors. This section is an attempt to construct, in brief, a holistic picture of the constraints on, and efforts at, development in the two district, and how they affect the teaching of agriculture in schools.

Demographic Data

District I: Kiambu. Kiambu is a district in the Central Province of Kenya. About 90% of the population is engaged in extensive agriculture. The district accounts for about 40% and 20%, respectively, of the total coffee and tea - the country's major output - produced in the country. It occupies land of about 2,451 square kilometers, out of which 493,000 hectares represents good agricultural land. The region has good soils, adequate rainfall (1200 - 2250 mm) and moderate temperature suitable for agriculture. The district has a total population of about 828,290, with a population density of 280 people per square kilometer. The growth rate of the population is about 3.8% per year (Kenya Government Statistical Abstract, 1987).

The district of Kiambu has also been actively developing its infrastructure and the people participate actively in the market economy. The district is dominated by the Kikuyu (the largest ethnic group in Kenya) and, Kikuyu, the local language, is used in homes of the school catchment areas. Kiswahili, the national language, and English are taught or used only in schools. Christianity is a dominant religion.

Favorable climatic conditions in the district attracted European settlers and missionaries during the colonial period. White settlers acquired and "owned" huge tracts of land deemed to be vacant by colonial authorities. White settlers were able to establish large plantations of coffee, tea, pyrethrum, and fruits, and large ranches and farms for animal husbandry. Farming became large-scale and commercialized. The indigenous Kikuyu were pushed off their land to other parts of the country, although many remained as squatters to provide labor for white commercial farmers. Land scarcity has been a crucial issue in the district and it was one of the major causes of the struggle for independence (Leys, 1975; Muriuki, 1974; Ochieng, 1985). The Kikuyu like other ethnic groups, were forbidden by the colonial government to cultivate profitable cash crops like coffee, tea and pyrethrum. However, the disturbances of 1952, forced the government to relax its laws. The Colonial government report - Swynnerton Plan (1949) - gave African farmers the right to participate in cash production (Colonial Office, 1955). Thus, many Kikuyu who had farms took advantage of the new approach to agricultural development and started producing cash crops.

After independence in 1963, the government embarked on solving the land problems in Kiambu and other parts of the Central Province. The government bought land from the white settlers and distributed it to landless Kikuyu. Those who were financially able acquired large areas, which included well established and developed farms. However, the majority settled with small pieces of land of about four to ten hectares. This enabled the people to obtain land titles from the government. The implication is that farms were to be used intensively as farmers practiced commercialized farming.

The land cultivated by typical families in Kiambu District ranges from 1.2 - 3 hectares. These small farms account for 82,000 holdings. Large farms owned by either individuals, cooperatives or companies comprise about 60,000 hectares of high potential land (Kenya Government, 1987; Ndirangu, 1989).

The principal food crops include maize, potatoes, yams, vegetables, and beans. Cash crops grown include coffee, tea, pyrethrum, sunflower, and wattle. Among the fruits grown are oranges, pineapples, bananas, pears, and plums. Cattle, sheep and goats are also kept for milk and meat, while horses

and donkeys are kept for transportation. Farming in the district is well developed and mostly mechanized. The use of agricultural technologies are wide spread in the district.

The proximity of Kiambu District to Nairobi, the capital city, acts as an incentive because of the high demand for agricultural produce in the city. Kiambu is the largest supplier of horticultural products to Nairobi. Farmers do not only produce for subsistence, but are also involved in cash production. Agricultural extension services, research stations and financial institutions are well established in the district, supporting the agricultural sector. With land titles, farmers are able to acquire credit to improve their production.

Schools in Kiambu have more resources and facilities than those in Kwale district (District II): well constructed and well maintained buildings, classrooms with enough desks and chairs, and large staff-rooms with good furniture. The number of schools and enrollment has increased over the years, for example, primary school enrollment has grown from 191,814 in 1984 to 206,462 in 1987. Schools are closer together in Kiambu compared to Coast province. In Kiambu, for example, each primary school serves an area of about 15

square kilometers compared to about 200 square kilometers in Kwale Districts. While a primary student in Kiambu travels an average of 2 kilometers to school, a student in Kwale travels an average of 8 kilometers. The distance from school is a factor which has affected school enrollment and drop-out rates in many rural areas in the country.

The language of instruction policy for rural primary schools in Kenya states that the mother tongue is to be used as the medium of instruction from Standard I through III, at which time instruction via English begins. Thus Kikuyu was the initial language of instruction in the rural district, with Kiswahili and English taught only as subjects from Standard one.

District II: Kwale. Kwale District is on the southern coast in the Coast Province of Kenya, on the Indian Ocean. Although the region has some agricultural potential, agricultural activities are not highly developed. Kwale District has one of the lowest agricultural production rates in the country. The district includes 8,323 square kilometers, with about 831,200 hectares of good agricultural land. The district has moderate rainfall ranging from 501 to 700 millimeters per year, with a hot

o

humid climate. The total population is about 300,150 people, with a population density of 35 people per square kilometer. The growth rate has been estimated at 2.3% (Kenya Government Statistical Abstract, 1987). It is drier than Kiambu District.

The Digo people - one of the largest ethnic groups in the Coastal province - dominate Kwale District. Digo is the major local language, although Kiswahili, the national language, is the mother tongue of many people in the district, and serves as a lingua franca, which increasing numbers of Digo speakers use in lieu of the mother tongue. Kiswahili is commonly used in the school catchment areas, and is the language of instruction in Standard I to III. English is taught and used only in schools. Islam is the dominant religion.

Before colonization, agriculture was the mainstay of the economy of the coast. The wealth of the Digo community, like most ethnic groups in the region, was based on plantations worked by slaves. Historical evidence show that the agricultural production depended mostly on the availability of slave labor. Any reduction, therefore, of slave labor on the plantations or "shambas" (small farms) meant reduction of

the area cultivated, thus resulting in a decline in the economy (Mambo, 1980; Salim, 1973; Spear, 1978).

Prior to independence most land in the district, like in other parts of the Coastal region, was owned by Africans and Arabs. The coming of the missionaries in the nineteenth century was the beginning of European settlement in the Coastal province. Although, land alienation was not on a large scale as it was in Central province, some areas owned indigenously were either alienated or declared Crown land. As in Kiambu, this affected the traditional land tenure and restricted Digo participation in agriculture.

However, at independence, some land in Kwale was turned into the Digo Settlement Scheme, this "Ethnic Land" intended to protect the interests of the indigenous Digo community. However, many groups from Central and Western Kenya, where land was scarce, migrated to settle on the south coast (Mambo, 1980; Salim, 1973; Spear, 1978;).

This "ethnic" land arrangement was abolished in the early 1970s. Unlike in Kiambu, this opened Digo land to more immigrants from up-country. It also led many Digos to sell their land to private entrepreneurs. At the same time, large

tracts of fertile land, particularly along the coast, have been reserved for or transformed by individuals or the government into hotels or cottages. Kwale District is known in the country for its fine beaches, and is an important region for the tourism industry.

Land cultivated in the district is very small, about 1 - 3 hectares per family, despite enough land with a density of 35 people per square kilometer. Most farmers are subsistence producers growing maize, cassava, rice and sim sim as food crops. Coconuts, cashewnuts and sugarcane are the main cash crops in the region. Mangoes and papayas are the major fruits grown. Large tracts of land lie fallow with wild coconut and cashewnut trees. Farmers still use traditional methods of farming, although modern agricultural technologies and practice - seeds, fertilizers, line planting, proper spacing - have been promoted by the government through extension workers and by commercial farmers in Shimba Hills Settlement Scheme and Ramisi Sugar factory, areas that have received exceptional treatment. Most farmers do not possess land titles, thus are unable to secure credits to increase farm productivity.

Historically, the Digo, like the other ethnic groups in

the Coast Province, have had contacts with the Oriental people (Asians) from as early as the tenth century. This has influenced their way of life and participation in economic activities. Tourism and Arabic way of life has, for example, made many people in Kwale, particularly those along tourist routes engage in small scale road side trade instead of engaging in farming. The tourist industry has also affected the school going youths. Some of them drop-out of school to serve tourists.

In general, Kwale District is one of the less developed districts in Kenya, with low agricultural productivity and little participation in the cash economy. However, the demand for education has consistently increased over the last five years. For example, primary school enrollment has increased from 30,952 in 1980 to 62,227 in 1984, an increase of 22 per cent compared to 4 per cent in Kiambu District (Kenya Government, 1987).

Kwale District has few schools, and as mentioned earlier, primary school children have to walk long distances to and from school. Schools in this District were less well equipped than those in the Kiambu district. Although most buildings were well constructed, some were incomplete and

were not well maintained. Staff-rooms were tiny, with little furniture. Three or more students shared a single desk.

Like in Kiambu, the language of instruction policy for rural schools applied to Kwale schools. Kiswahili was the initial language of instruction and English taught as a subject (Digo is not spoken by a large enough number of people in the district to warrant its being one of the nation's designated mother tongue languages - there are 16 such languages - that can be used for instruction). The switch to English as a medium of instruction in upper primary is not abrupt, as the initial language of instruction and/or mother tongue continues to be used in class for explanations. By the end of the primary cycle English predominates.

Disparities in Development: Kiambu and Kwale

Events in a society cannot be properly understood apart from their history, hence educational structures and their impact on society must be examined historically.

As stated earlier, like all societies, Kenya has always had a body of knowledge passed on, and learned informally, from one generation to the next. Historical and ethnographical studies in Kenya, like in other African

countries, have described and analyzed the purpose, structure, and role of traditional African education (Datta, 1984; Kenyatta, 1976; Spear, 1978). Education was part of culture and an important agent of socialization for the development of individuals and the society. This important historical and ethnographical fact is, in most cases, overlooked by scholars who analyze the impact of formal education (schooling) in African societies.

The coming of the Europeans into Kenya in the 19th century with their institutions transformed socialization and learning patterns in Kenyan societies. The major impact was the development of faith in the ability of schooling to promote economic development. This faith explains the struggle of Kenyans to acquire formal education during colonial periods - this quest was more pronounced in Central province. After independence in 1963, the demand increased even further. Enthusiasm for education could be accounted for by two factors: 1) the colonial government had limited educational opportunities to Africans, and 2) independence created the problem of manpower to run the inherited market oriented economy. Thus, there were many opportunities for those who had academic qualifications.

Post-Independence economy needed an 'educated' population to take over from the colonial government. Thus from 1963, the thrust was towards secondary and higher education. The Kenyan government encouraged people to build more schools for their children. However, one thing was apparent, there were regional disparities in educational development (Court and Ghai, 1974; Kenya Government, 1964). In Kiambu and Kwale districts, the differences were great. Kiambu had more schools and other social infrastructure than Kwale district. The regional disparities in education have continued to exist and has extended to rural development.

Several reasons have been given to explain the imbalance of development in the two districts. The first is the argument that Coastal people lack the effort to participate in development because they are not development conscious. They are accused of not availing themselves to acquire "modern" values, which are directly related to development, as Kiambu people have done. The second hypothesis is that the Coastal people are just as development conscious as the Kikuyu. What they lack are opportunities. It is assumed that if given such opportunities the people can prove themselves. The third explanation is that the history of accumulative neglect through the colonial era accounts for

the "underdevelopment" of Coastal province (Parkin, 1972; Mambo, 1980; Morris and Somerset, 1971; Spear, 1978).

Comprehensive analysis of environment and natural endowment, socio-economic and political activities, together with historical factors, tend to account for disparities in Kiambu and Kwale. The underdevelopment of education, and even the economy, in Coast Province is not just a simple issue related to slavery or laziness as it is commonly suggested by policy makers, politicians and researchers. From a historical perspective, development programs and support, educational or otherwise, within Kwale (Coast province) as compared to those in Kiambu (Central province) had been of peripheral emphasis. The abolition of slavery in 1876 had a major effect on the coastal economy which was based on slave labor. Plantation owners, for example, were unable to get free labor to sustain their economy. They even failed to adapt to a new form of free market oriented economy introduced from the west after slavery was abolished. This meant the reduction of agricultural productivity and in most cases the abandonment of the plantations.

The Kenya-Uganda railway was another significant factor in the decline of the coastal economy. The railway raised

the demand for paid labor and brought in a steady flow of Indians immigrants, who were merchant oriented and followed the railway into the interior. Indians dominated the trade along the railway posts and in administrative centers by establishing permanent trading centers. This changed the whole economic and commercial pattern within the coastal region. The successful Arab-Swahili traders who travelled back and forth to the interior with trade goods were unable to compete and were soon eliminated. This became a second blow to the wealth of the coastal communities.

A move to the interior by the missionaries and the colonial government, after the construction of Kenya-Uganda railway, had adversely affected the development of educational foundations and uprooted the thriving commercial activities along the coast. This move was justified by two factors. First, the complex and intensive struggle between Islam and Christianity. By the time the European missionaries came to Kenya around 1840s, Islam had already taken root in the Coastal province. Community values, attitudes and behavior among the coastal communities were strictly controlled by the Islamic faith. This was extended to trade and community activities in general. Islam together with Koranic schools (Madrassas) were seen as important

agents of societal development. Thus, anything which was seen as disrupting the Islamic faith was opposed. The fact that schooling was introduced by Christian missionaries explains why there was low enrollment in the schools. This forced the missionaries, and later the colonial government, to close the formal schools after only a few years of operation. Parents were not ready to send their children to school to learn Christian beliefs, which according to committed Muslims, was foreign and against their own beliefs. By 1963, however, this perception had changed drastically and parents were demanding formal education regardless of religion. The second factor is that Central province is has a viable economy. The fact that it has good soils and adequate rainfall and temperatures attracted the settlers and politicians who wanted to settle and engage in agricultural production.

Therefore, with the abolition of slavery and with the construction of Kenya-Uganda railway, the Digo like most coastal communities were cut out of the 'wagon' of development. The economic foundation in Kiambu laid by the colonial government was dismantled in Kwale district when the Muslims adamantly refused to learn scriptures as part of the western education.

Even with an independent government, Kiambu has benefited from its natural environment (good soils and adequate rainfall). The fact that development projects, especially in agriculture, are sensitive to cost/return ratio, marginal areas like most of the Coastal regions tend to suffer. Due to lack of resources and the pressure to develop rural areas, the government has tended to allocate resources to areas with proven cash crops such as coffee, tea, pyrethrum, and wheat. Thus, infrastructure development, loans, aid and agricultural research tend to be focused towards such areas. Kiambu's rate of development is therefore higher than that of Coastal regions. Kiambu people have effectively used the economic advantage they have had in developing education in their area, for example they have managed to raise money through Harambee (self-help) effort.

Since independence, there has been greater motivation in Coast province to provide and expand educational opportunities. The rationale being that more children from the region need to be educated to give the province a major representation in national development - an opportunity it has not enjoyed like its counterpart, the Central province. In Kikuyuland on the other hand, the struggle is to maintain,

and even increase, their influence in national development. Investment in education is seen as one of the major tools to achieve this aim. The level of economic development in the country in terms of agriculture and commerce, on one hand, and industrial development (cottage industries included), on the other, have increased the demand for qualified manpower. To meet this demand, Kenyans organize their efforts to finance educational development. The Harambee (self-help) approach has been used to supplement educational financing from the central government. There has been rapid expansion of educational development in Kenya as a whole since the 1970s (Kenya Government, 1988). However, this expansion though remarkable in Coast province, has not been at the same rate as in Kiambu.

In sum, the disparities between the two districts in terms of school resources and facilities can be explained by economic differences between the districts. Kiambu is a much richer district than Kwale. As a result, resources for local support differ too. Although schools in Kenya are administered by the central government, they depend on local communities for support beyond the bare necessities of buildings, facilities and teachers' salaries. Local communities contribute through donations for school

establishment, maintenance and extension. For example, a poor rural community such as Kwale is unlikely to have the funds to pay for upkeep of school furniture or even buildings.

Socio-economic and ecological factors have major implications on the teaching of agriculture, and on how students think about and practice what is learned in school. The next chapter discusses the teaching of agriculture in the primary schools in the two districts.

CHAPTER FOUR

THE TEACHING OF AGRICULTURE IN PRIMARY SCHOOLS

This chapter describes the teaching of agriculture in the four schools studied, focusing in particular on the manner in which classroom theory was translated into actual agricultural practice on school plots and in the community. The first section of the chapter deals with in-class teaching, in particular the constraints on the effective teaching of agriculture. The second section deals with the ways teachers tried, despite the constraints, to enhance students' knowledge in agriculture. And the last section examines the link between school instruction and community agriculture practice.

To re-iterate, a total of 156 lessons in standards VI and VIII in the four schools were observed and taped. Thirty two of these were practical lessons in school plots. Whenever pertinent, the author has provided salient quotes of teacher-student dialogue during the course of instruction.

Patterns of Instruction in Agriculture Classes

The classroom is an important environment for an individual's social, cognitive and educational development (Abagi, 1985; Cleghorn et al 1989; Dreeben, 1968). While this is a much more complex process when there are cultural discontinuities between the school and the community, the analysis of classroom discourse - teacher-student - interaction - is nevertheless an important aspect of explaining the influence instruction might have on students.

The teaching of agriculture in Kenyan primary schools generally illustrates how difficult the process of imparting innovative agricultural knowledge to students can be. In particular, it indicates the complexity of translating classroom theory into actual practice in the community.

This study has shown that there are major constraints to the effective teaching of agriculture. They include: 1) dictates of the agricultural syllabus, 2) the influence of Kenya Certificate of Primary Examination (KCPE), 3) ecological factors and lack of teaching facilities/materials. These constraints tend to interact with, or reinforce each other during the course of classroom instruction. In particular, a strong teaching emphasis on the preparation of

students for the national examination, the KCPE pervades instruction.

Dictates of the Syllabus

As mentioned in the last chapter, the agriculture curriculum is developed centrally for all primary schools in the country by the Kenya Institute of Education (K.I.E.). It is practically oriented and is intended to develop students' skills in self-reliance, self-employment, and to prepare them for further education, training and employment (Kenya Government, 1988).

The Agricultural Syllabus covers various topics in agriculture and points out teaching activities that, if covered adequately, may help students acquire useful agricultural knowledge and skills. However, implementing what has been clearly expressed in the syllabus has been problematic in many parts of the country. The fact that the syllabus is centrally decided may impede regional adaptation: it is either too general or ties with examples from specific areas (for instance, those regions which have a developed agricultural environment, like Kiambu). This makes it difficult for teachers, particularly from agriculturally poor districts like Kwale, to teach what would be locally relevant

and deters innovation or creativity during classroom and/or out-of-class instruction.

The primary school agriculture syllabus seems to place emphasis on the relevance of primary agricultural education to rural development and not on the methods it proposes for imparting agricultural skills or fostering positive attitudes towards farm work. The focus is on the details of farm practices - farm structures, farm equipment, animal breeding, bee keeping, fish farming, etc. The skills to be learned, although not explicitly identified, consist of vaguely defined skills to be absorbed by students in the course of agricultural instruction. Generally, there is the problem of simplicity. The syllabus tends to stress simple operations - identifying farm labour, finding information about animal breeding and selection, identifying the proper use of equipment. The emphasis seems to be on "what" should be done rather than on "why" or "how" it should be done. Available time and school facilities, which are very important for the implementation of any policy, seem not to have been taken into consideration. For example, many topics in the syllabus are practically oriented, particularly in Standard VIII, but the time allocated (one double period a week) for them to be successfully completed is inadequate.

The above restrictions were considered to have a direct influence on agricultural instruction and on the actual content of what was taught. Because the school curriculum is produced centrally and students prepared for KCPE, the methods and patterns of teaching in the four schools were similar. The syllabus was strictly followed, with very little digression. Usually the title of the lessons were taken from the syllabus, and recommended textbooks and teaching guides were used to prepare lessons. The most commonly used textbook was Patel and Visishta's book, Learning Primary Science and Agriculture Book 6 and 8. Nairobi: Mwalimu Publishers. Teachers reported that they preferred this text over others because of its detail. There was however, some disagreement among the teachers whether the above text was among the officially approved texts. In most cases it was only the teacher who had a copy of the textbook.

Because of the tendency to adhere strictly to the syllabus, teachers in most cases told the students what they were expected to do, either in the classroom or in the school garden. Nevertheless, classroom instruction and practical activities tended to lack coordination. For example, a teacher would be talking about poultry-keeping during

classroom instruction; in the following period's/or week's lesson - if it happened to be a practical one - students would be instructed to go to the school garden to plant some maize or make compost manure. This meant that there were no immediate lessons given to students prior to their practical activities in the gardens. School garden activities were evidently dictated by ecological factors.

The content and directives of the syllabus generally restricted what was taught. Any concept or body of knowledge which was not treated explicitly by the syllabus was handled with caution, if at all. For example, teachers made very little effort, if any, to connect the content of agricultural instruction to indigenous knowledge and practice reflecting the minor role given to such matters in the syllabus. Even when indigenous knowledge was drawn upon, it was down-played or disregarded. For example, a standard VI lesson in a Kiambu school on animal feeds proceeded as follows.

Teacher: Now in health science we have learned that we should feed in balanced diet. Also animals need balanced diet. How do we know that the food we are giving the livestock is a balanced diet?

(silence)

Teacher: Do you know? What do you give to cows and goats at home? Eh what do you give?

Student: kale

Teacher: There are some who give kale (pre-prepared animal feed). What else do you give them?

Student: Daily Meal (chorus)

Teacher: Daily Meal (pre-prepared feed) and what else?

Student: grass

Teacher: eh grass (reluctantly), and if you start giving them grass alone, are we balancing the food?

Students: No (in chorus).

Teacher: No, we are not balancing the food.

The teacher's reluctance in accepting the answer "grass" and his comment, show how complex the process of translating classroom theory into practice can be. The teacher was trying to get across the idea of balanced diets. However, "grass" is the main local/indigenous feed used by the majority of farmers to feed their livestock. The question is that is it, all by itself, enough? Instead of getting into this complex issue, which could have generated discussion, the teacher stressed the feeds usually bought in stores, pointing out that they represent a balanced diet.

Teacher: Therefore to make sure we give them a balanced diet, we must not rely on grass and other foods from our gardens. You must give them bought food which is already prepared. You have told me about bread isn't it"

Students: Yes (in chorus)

Teacher: These are the foods I am talking about, the foods bought from the shops. And those people who prepared these foods had in mind that they are good for animals

(School A, Kiambu 1989).

Although "bought foods" were stressed in this lesson, in most communities in Kenya, Kiambu included, most farmers feed their animals traditionally. Instead of buying feed from the stores, they prefer making their own feed or taking the animals for grazing. According to parents in Kiambu pasture grass (Rhodes or Kikuyu grass, for example) is good for cattle. It was observed that many farmers tried as much as possible to feed their animals with this type of grass. Most farmers in Kiambu have Kikuyu and Napier grass on a portion of their farms. In contrast, in Kwale, grazing is still a common practice due to availability of land. Also, the practice of taking animals to lick natural sodium carbonate is still very popular among farmers in the region.

Another example worth citing was a standard VI lesson on "Land Use" in School C in Kwale.

Teacher: In Kenya everybody can have his own land, even yourself And you can practice these

things (referring to techniques of farming).
How then can you obtain a certain piece of
land. Yes?

Student: Inherit

Teacher: okay (in a soft voice), inherit from your
father. Somebody else.

Student: Buy

Teacher: Yes, you buy, very good. You save enough money
and then you buy (repeated twice). You do
what?

Students: Buy (chorus)

Teacher: You buy. How are you expecting to get a piece
of land Salim?

Student: to be given

Teacher: Eh, who is giving land nowadays! Now Hamisi
is talking of being given. He is still looking
forward to be given

(School C, Kwale 1989).

This teacher also showed clearly that he was interested
in market-oriented ways of land acquisition and ownership.
In many communities however traditional methods of acquiring
land are integrated with market-oriented approaches. In
fact, in some cases land is still given free by the
government. Such was the case of the Shimba Hill settlement
scheme just a few kilometers from school C.

While local practices might serve as pivots for effective instruction, the tendency is to shy away from them and to retreat to the syllabus. This effort however may diminish school-community linkages and thus exacerbate home-school discontinuities. Something which education reform in Kenya was to rectify.

Influence of Examination

As we saw earlier, national examinations in Kenya have assumed extreme importance because results influence one's life's chances by determining who will gain entry to secondary school. Because of the scarcity of secondary school places, preparation for the examination (KCPE) becomes a fixation. Thus, the introduction of any lesson in agriculture, just as in other subjects, was put into the context of the national examination. Since the questions on the KCPE are of multiple-choice design, teachers make sure that students are drilled to answer such exam questions correctly. Such teaching procedures, in turn, affect the content of the what is delivered to a class.

An agricultural lesson began with a recapitulation of the previous lesson, either in a question form or in the form

of summary, as in the example below:

Teacher: Last time we were talking about "Structures in the Farm". One structure which is found in the farm?

Student: Crushes

Teacher: Crushes, yes another one?

Student: Hutch

Teacher: Hutch, another one?

Student: Dairy shed

Teacher: Dairy shed

Student: Feeding trough

Teacher: Feeding trough, good. Today we are going to talk about the Components of Soil. The components of soil! What does that mean?

(School A, Kiambu 1989)

N.B. (A KCPE question might read: "which of the following structures is not found on the farm: a) crushes b) co-operative stores c) hutch d) feeding trough").

Students have to know how to select correct answers from others which are less correct. Thus, in most cases questions are asked which call for short, direct recall answers. The low cognitive level of most examination questions tend to subordinate classroom instruction to the development of high-level cognitive skills limiting the understanding of

important, basic process.

Factual recall was also elicited through sentence-completion exercises:

Teacher: In the last lesson we said that when a worker bee settles in a flower she sucks something using her tongue. What is this something?

Student: nectar

Teacher: nectar, good. And this nectar is from a ---?

Students: a flower (in chorus)

(School D, Kwale, 1989).

This question-answer pattern was modified slightly by turning to fill-in-the blanks statements:

Teacher: the soil has what is called living things. We call them living ----?

Students: things (in chorus)

Teacher: living things. Can you name some living things?

(School C, Kwale 1989).

The majority of lessons consisted of bits of information

being given to students. Teachers initiated these exchanges and maintained control of the direction of interaction throughout the lessons. That is, the language used to convey this information was restricted in scope, as were the ideas being presented. One could argue that in the light of students' examination needs, this was all that was necessary. A teacher-centered approach may possibly be effective in preparing students for the national examination, but, this will not likely make agricultural instruction change how students think about and practice agriculture. This is because the process restricts the scope of the lessons and the intellectual challenges which students could have been offered.

Three months to the end of data collection, students sat for the "KCPE Mock Examination" which was organized by the divisional examination committee comprising of teachers from all schools in the division. The results from mock exams are used to determine if students are prepared for the main exam. Questions in the mock Science-Agriculture paper were modelled on previously nationally set KCPE examinations. For example, the question below is based on a lesson on "animal management" in which the content was restricted to examination.

Question:

Which of the following characteristics is least important when selecting cattle for beef production?

- A) High milk yielding
- B) Early maturity
- C) Fast growth rate
- D) Ability to breed regularly

(Githunguri Division Assessment Test, 1989).

The correct answer to the question is "A". The question is closely tied to what was covered in the lesson which was recapitulated as followed:

Teacher: Now, I would like you to answer some questions ... Give me the definition of the word "selection." To select, what do you understand by the word to select?

Student: To choose the best

Teacher: To choose the best ... When you want an animal for breeding or when you want to keep livestock, what comes to your mind first?

Student: The amount of money

Teacher: The amount of money? we are not going to buy, were are going to select. What should come to your mind?

Student: What type of animal

Teacher: Very good. What type of the animal you are going to keep. Then what next?

Student: The purpose

Teacher: Yes, that is the purpose of selecting that animal. Do you want it for meat or for milk. What else?

Student: Should be healthy.

(school B, Kiambu 1989).

Other qualities mentioned by students included: "fertility, high yielding, and early maturity."

Although students had to understand the concept "least important" and think through what they have been taught or what they know to derive the answer, they needed very little reasoning to do so. A simple recall of what was taught, that beef cattle has little to do with milk production, was adequate. Apart from testing rote learning, an issue that 8-4-4 curriculum is trying to correct, the rationale for such questions in terms of eliciting knowledge about agriculture is restricted. Such questions appear to have very little to do with assessing how students can apply what is learned during classroom instruction.

However, not all examination questions on agriculture are of this nature. Some questions are of a high-cognitive level which require students to make explicit connection between classroom instruction and knowledge about good

agricultural practice. The example below is one of the questions on Science\Agriculture paper for Kwale District KCPE Mock Examination:

Question: Scientist at Ndaraya research station in Kenya carried out an experiment to find out whether planting cotton early and spraying the plants to kill insects would give a heavier crop. Their results were:-

| WEIGHT OF COTTON IN KG\HA | | | |
|---------------------------|--|---|---|
| | Planted at start long rains (mid. March) | Planted six weeks after long rains (early May) | Planted after start of long rains (mid June) |
| No spray used | 1230 KG | 700 KG | 120 KG |
| Sprayed twice | 1270 KG | 970 KG | 160 KG |
| Sprayed four times | 1480 KG | 1150 KG | 270 KG |

Judging from these results, which one of the following is the MOST IMPORTANT advice the agricultural officer should give to farmers about growing cotton?

- A) Cotton seeds should be planted as soon as the long rains begin.
- b) It is better to plant cotton seeds in May than in June.
- c) Cotton plants should be sprayed four times during the growing season
- d) It is better to spray cotton plants twice than not to spray at all

(Kwale District KCPE Mock Examination, 1989).

The answer to the above question is "A". The question required more than simple recall of facts by students. They had to make connection between what was taught and their knowledge about good agricultural practice before getting the correct answer. Although the question does not elicit knowledge that is important for understanding why cotton has to be planted at the start of long rains and sprayed, such questions offer the possibility of influencing classroom instruction and enhancing students' understanding of the principles of "modern" agriculture. Unfortunately, questions of this type form a very small percentage of all the questions in the KCPE examination.

The instructional patterns detailed so far illustrate how little attention is given to explanations of processes and how little is expected of students in terms of expressing understanding orally or in writing. Students rarely are asked, for example, to explain why it is necessary to use the right quantity of fertilizer. This approach, may have a questionable impact on the enhancement of students' knowledge of agricultural practice.

Ecological Factors and Lack of Facilities

Regional ecological factors contributed to the general lack of facilities for effective teaching of agriculture, especially in Kwale where conditions were so sterile and dry that school plots failed to provide demonstration of what was taught in the classroom. That is, the curriculum seems to work best where agriculture is most developed. For example, in Kiambu, students had better opportunities to know and practice what is taught in school because of the agriculturally rich environment and the community's economic and other interest in agriculture.

Although all four schools in the study had school plots\gardens, they were small pieces of land less than one eighth of an hectare in size. This was attributed to a lack of land. The school plots were mainly for gardening, where food crops - maize and vegetables were grown. The plots were not fenced and did not have the three parts as indicated in the syllabus - demonstration plot, museum, and project. However, schools A and B (Kiambu) each had what the administration referred to as a school farm of about three hectares. These were different from the school gardens because they had the main cash crops - coffee and tea - and

were run by the Parents-Teachers Association (P.T.A.). Students were not expected to work in them. The main reason behind having separate school farms was economic, it being felt that land in Kiambu has too high an economic value to be left for experiments by students. Although students did not participate in the production and the selling of the produce, it was encouraging to learn that income from such farms went into the school treasury for up-keep of the school. In Kwale, such farms were non-existent.

The lack of facilities and teaching resources forced teachers, in most cases, to teach theoretically important topics which could have been understood better in practical lessons. One of the many examples of such lessons is summarized below. A teacher in a Kwale school was teaching standard VIII students about poultry keeping.

Teacher: The birds (referring to chicken) that are kept here are of different breeds. There are different types of chicken for example White-legion, Light-tapet, and the Rhode Island. Each breed is kept for different purposes. Those kept for meat are called broilers, and egg producing chicken are called layers. But there are some which are kept for both. Those kept for both means that they are average producers of eggs as well as ---.

Students: meat (in chorus)

Teacher: As well as meat.

Because of a lack of poultry projects in the school or in the community nearby, the teacher had difficulty in differentiating the breeds. Although the text was in black and white, the teacher cited color as the major difference.

Teacher: White legion is wedged-shaped and the tail is upright. Now for the light-tapet, which is kept for meat, has a white color and black, and a little bit of yellow. Do you know what I am referring to ?

Students: (murmuring)

Teacher: Its tail. The color is white and it has black stripes I would like you to refer to page 178 of your textbook "Learning Science and Agriculture Book 6." (holding the book for students to see, pictures are in black and white. Only a few students had the text). Not now, later. The birds are well drawn there. Now, for Rhode-Island red it is dark-brown in color and has a broad body.

After discussion of layers and broilers, the teacher asked a leading question to find out whether the students grasped what he had just talked about,

Teacher: If your father brings hens home, how would you tell a broiler from a layer? What would you look for?

Students: (no response)

Teacher: Look at the color or the type?

(School D, Kwale 1989).

This could have been a more interesting lesson if there was a poultry project in the school or if students visited a poultry project in the community. Students, even the teacher, would have found it easier to differentiate broilers from layers.

Another example is from a standard VI lesson in a Kiambu school on "Husbandry practices." Although the syllabus states that activities under this topic should be done practically, for example selection and breeding of animals, feeding, and housing, the lesson was just taught theoretically because of a lack of practical agricultural projects in the school garden. The teacher found it easier to handle the lesson because animal husbandry in Kiambu is well developed. Thus, the teacher was able to give local examples which were familiar to the students. It would have been a very difficult lesson to teach in schools in Kwale where animal husbandry is not well developed.

Out of three agricultural periods per week indicated in the school time table, one is a double period to be used for

practical lessons (a period is 35 minutes). However, in most cases it is used for in class teaching because of insufficient time to complete practical activities and/or undeveloped school plots. There were no farm visits by students during the whole research period. Instead, teachers used their experience to refer to well-established farms in their districts or in other regions. In Kiambu, students were usually instructed to visit farms on their own as assignments. This was possible because of a well-developed agricultural environment.

During the research period, there were a few cases where Agricultural Extension Officers were invited to give lectures and demonstrations to students. This was observed three times in Kiambu, and only once in Kwale.

It has been shown that the teaching of agriculture is constrained by various factors. In particular, the agricultural syllabus and examination (KCPE) orientation continue to restrict the content of what is taught as well as the teaching methods. In addition, ecological realities affect the opportunities for translating classroom theory into practice. These features of the teaching-learning process are bound to affect the ways in which students think

about and practise agriculture.

Agricultural Instruction and Enhancement of Knowledge

Despite the constraints to the implementation of the agricultural curriculum, several lessons were observed in which important principles were linked in informative ways to actual practice. These lessons showed that agricultural instruction may succeed in consolidating the students' prior knowledge and develop skills in agricultural practice. For example, decision making and record keeping were among the organizational skills observed to be taught that are important for efficient farm management. It was often noted however that the emphasis tended to be placed on cash crops rather than on food (subsistence) crops, perhaps in the name of promoting "modern" agriculture and development.

A well organized lesson began with a definition of concepts, followed by the idea of making choices (a concept based on reasoning and requiring thinking, e.g. why choose A instead of B). This was followed by classification (meat, milk, etc).

Teacher: Today we are going to talk about animal management, and we are going to deal with selection and feeding of animals. Selection means choosing the best. Now when you have so many things automatically you have to choose the one you like best. Now, when it comes to selecting the animals there are important things which we have to consider: first, we are to consider the type of livestock we have to select; second, we are to consider the purpose-why do you want that animal. Do you want it for milk or for beef. These are the things you put in mind before selecting the animal.

The teacher then guided the discussion on the qualities to look for in selecting animals for breeding and how they should be looked after.

Teacher: We have the animals that we keep for meat, and we keep some for milk. Others like poultry we keep for eggs and others for ---?

Students: Meat (chorus).

Teacher: eh?

Students: for meat (chorus).

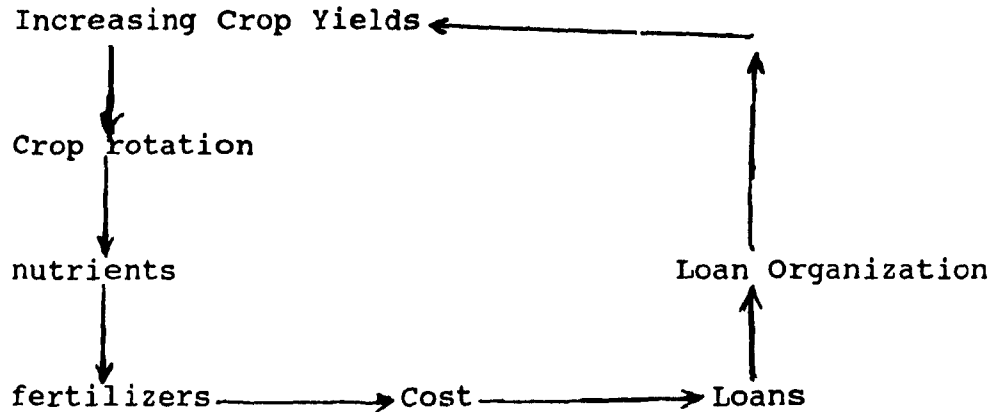
Teacher: Meat, so when you go to select the animal, you have to select the animal according to what you want it for. Then you have now to look for the qualities. Now when we talk about qualities, first you have to consider the animal with high yield; then number two, you have to consider the health of the animal; number three, you have to consider whether the animal is hard and tolerant to disease and weather conditions. Number four, early maturity or maturing

(School A, Kiambu 1989).

Ten to fifteen minutes were then spent discussing the four qualities, one after the other, giving concrete, local examples. In the process, the teacher stressed the effect of climatic conditions on animal husbandry. This is a crucial factor in Kenya because it is necessary to breed the right kind of animals in the right environment. This is because, in the words of the teacher, "there are some animals which when you bring from say Rift Valley to here (referring to the local environment) they are affected by weather.... which can make the animal reduce production or even die" (School A, Kiambu 1989).

Some times the simplification of lessons (for examination purposes) had beneficial results ensuring that what was taught could be grasped. The pattern was, as noted, simple, but comprehensive, with one idea leading logically to the next (figure I). For example, in a standard VIII lesson of "factors affecting agricultural production" in school "A" in Kiambu, the lesson objective was to teach about increasing crop yield. This brought in the discussion of crop rotation, soil nutrients, the use of chemicals and fertilizers, which in-turn led to information about loans and loan organization.

Figure I



The discussion of how crop rotation could be done - allowing a piece of land to stay fallow, not substituting maize with millet - and the mention of loan organization and where information could be found, has important implications for how school instruction is related to community practice. At the same time, a mention of alternative agricultural methods like terracing, agro-forestry, zero-grazing, line-planting increases students' awareness of the scope of good agricultural practices.

The importance of agriculture in the daily life of Kenyans was another area of lesson emphasis. Information was provided about modern technologies, distribution of goods, importance of farm labor, and agricultural support services.

As part of Kenya's efforts to develop the country's infrastructure, agricultural research stations have been established. The presence of these stations and knowledge about what goes on in them is important for communicating to students the scientific nature of agricultural practice and its general importance to the development of the country. If this message gets through, agricultural practice as an occupation will increase in value and status. In several lessons a mention of such stations was made. Teachers dealt with specifics by giving concrete examples - names of the stations, where they are, and what they deal with.

Teacher: Today we are going to talk about agricultural organization In the republic we have certain organizations like 4K Clubs (the four "Ks" stands for kuungana (Being together) Kufanya (to work) Kuisaidia (to help) and Kujenga (to build) Kenya which are for primary school children. They rear for example rabbits and chicken, the best of which are taken to special agricultural shows. And by so doing these people feel motivated, they get encouraged on how to do more active work in this field. In secondary schools, they have other organizations - Young Farmers Clubs. These clubs encourage people to do more

farming as soon as they come out of school. Once out there they get services from Agricultural Advisory Centers, which are in every district.

Later

Teacher: People from the centers are sent to certain areas "you go to that area and teach the people how to use fertilizers and which crops need what kind of fertilizer or different kinds of manure, e.g. chicken manure, farm-herd manure, and what else?"

Student: compost manure

Teacher: Oh yes compost manure, good. Now these Extension Officers are to advise the people to use for example Twenty-Twenty fertilizer to grow what?

Student: Maize

Teacher: Maize. You use this kind of fertilizer to grow something like that. They also advise the farmers on how to use land for example, how to make --

Student: Terraces

Teacher: Terraces in order to prevent the water from carrying the fertile soil That is the work of extension officers. There are other centers called Farmers Training Centers in each district like this one of ours. Farmers are advised on how to deal with their pieces of land. Farmers visit there may be for a day or a maximum of a week

(School C, Kwale 1989).

Generally, the thirty-two practical lessons observed in

the school gardens indicated that students were instructed on basic principles of "modern" agriculture. One experimental lesson was exciting and useful to students. A teacher in school B (Kiambu) set up an experiment in the school garden to show the effect of fertilizers on hybrid maize seeds. Students were divided into two groups. Each group was given a portion of land in the garden. The first group planted maize without fertilizer, but the second group used fertilizers. The seeds germinated together, although not all seeds in the first group's plot germinated. After two months the crops in the first plot were drying, while those in the second group's plot were healthy and thriving. The students used to visit the school garden and were later asked to write a small report on their observation. In a follow up lesson in the school garden, the teacher answered several questions from students and explained why it is necessary to use fertilizers when planting hybrid seeds.

Practical lessons seem not only to be interesting to students, but also offer possibilities of developing other general skills which may be useful in dealing with development in general, and agricultural development in particular. For example, the ability to experiment, to observe, to keep records and draw conclusions.

The invitation of a local Agricultural Extension Officer to school A in Kiambu, provided an opportunity to observe a lesson that deviated from the syllabus. The officer talked of "Organic Farming" which he defined as "a branch of agriculture which deals with relying on natural nutrients without using chemicals and artificial fertilizers." This was a push for traditional methods coupled with a good explanation for their use. He gave a theoretical basis of this for 40 minutes using a historical perspective to convey his ideas to students. In his words ...

environment was so beautiful after creation
and our great grandfathers maintained it so.
But later when man started commercialization
and new methods of farming, the soil and
vegetation have been affected. We have become
lazy. We want easy work of using artificial
fertilizers and chemicals

(School A, Kiambu 1989).

Later the officer spent twenty minutes with students and teachers in the school garden demonstrating how to make compost manure. Students participated actively in this exercise. Prior to this demonstration the students had been asked to bring weeds and leaves from home. The extension officer gave students a chance to ask questions while he was doing the demonstration. Their participation was enhanced by the use of both English and Kikuyu, the local language.

The above sessions are significant because they illustrate the coordination of theory and practice, student participation, and the way extension work can be well integrated with agricultural instruction in school. At the same time it gives students an idea that "modern" technology can be harmful if not used properly, and that indigenous agricultural knowledge and practice can still play an important part in agricultural development. The way school instruction relates to community practices is crucial in facilitating this process.

School Instruction and Community Practices

The manner in which teachers drew on local agricultural practices to illustrate their lessons differed from one district to the other. In Kiambu where agriculture was the main occupation, local examples were readily cited and were immediately familiar to the students. For the Kiambu students therefore, there was little, if any, discontinuity between what was taught in school and agricultural practice at home. In contrast, teachers in Kwale had a much more difficult task. Since agriculture practice out of school did

not reflect the content of the curriculum, local examples would have been irrelevant and possibly confusing. Teachers met this problem by referring to practices inland (as in Kiambu) and by calling on students who originated from those areas to share their experience with their classmates. Unfortunately, the overriding need to prepare students for the examination meant that these teachers could not improvise or alter the curriculum to fit local conditions.

In schools A and B in Kiambu, teachers made statements which required students to turn to local community for answers. Statements like: "can you name one large estate you know around here," "in our homes, we grow different types of crops, can you name some," "we have such bodies here, who can mention a few of them" were very common. For example, in School B (Kiambu):

Teacher: Farmers get maximum advantage from these training stations. They go there and they are advised. We have got one in Kiambu just down here in Githunguri. What do we call it?

Students: Waruhiu (in chorus)

Teacher: Yes, Waruhiu. We have also got research stations, like the one in Nyeri. These are where research on agriculture are being carried. If for example, you take this plant and that other one, you get a very sweet fruit with no seeds (the teacher was referring to cross-breeding). We have such things here.

Are they the oranges or tomatoes?

Students: oranges (in chorus).

Teacher: yes, such things are being carried on research stations. We have got another one in Thika (in Kiambu) which deals with horticulture. Another station at Limuru (Kiambu) which deals with?

Student: potatoes.

Teacher: yes, potatoes

(School B, Kiambu 1989).

Classroom dialogue drawn from a lesson in school D (Kwale)

also illustrates the preceding.

Teacher: These organizations (referring to research stations) are established by the government so that farmers in different parts of the country will be informed of the right seeds, chemicals, fertilizers to use in their farms. We have many research stations in the country, who can name one?

Student: Ruiru Coffee Research Station.

Teacher: good, Ruiru Coffee Research Station in Kiambu district. Another one?

(silence)

Teacher: Machakos Katumani research station (in Machakos district) which mainly deals with arid and semi-arid crops. We have others in the Rift Valley, Nyanza and western. Do we have one in Coast Province?

(silence)

Teacher: This is your home work, go and find out!

(School D, Kwale 1989).

(There is one agricultural research station in
Kwale District - about 30 km. from school D).

The link between classroom theory and practice has the
possibility of increasing how students interpret school
knowledge and apply what is learned. The study indicated

that in the four schools the activities being carried out in the school gardens (plots) were not necessarily related to those carried out in the community farms. For example, students would be digging and planting, while in the community, farmers would be weeding or harvesting. This was contrary to what is stated in the syllabus. The school plots are required to act as a museum and have "a wide range of crops, even those which are not grown in the local area" (Jomo Kenyatta Foundation, 1987, p. 4). This was not observed. The school gardens had single crops - maize, vegetables or beans. Students were not able to observe various type of crops and farm methods which were found outside their community.

The idea of having school gardens as demonstration farms and museums may not be feasible with the limited lands in which schools are located. However, generally, the school plots in Kiambu district reflected local practices, but were small in scale and just a few of the local crops were presented (Table V). In this way school plots are something of a "token" of what is possible in the community at large. For example, the crops grown in the school gardens in the two schools in Kiambu reflected community agricultural practices, in that the main crops grown were maize and vegetables.

Table V

Comparison of Crops Grown in Family Farms, School Plots and in Students Home Projects

| <u>Crops</u> | <u>Home Farms</u> <u>KBU. KWL.</u> | <u>School Plots</u> <u>KBU. KWL.</u> | <u>Students' Projects/H</u> <u>KBU. KWL.</u> |
|-----------------|---------------------------------------|---|---|
| Maize | p p | p p | a a |
| Beans | p a | p p | p a |
| Veges | p p | p p | p p |
| potatoes | p a | a a | a a |
| cassava | p p | a a | a a |
| sim sim | a p | a a | a a |
| coffee | p a | a a | a a |
| coconuts | a p | a a | a a |
| Tea | p a | a a | a a |
| <u>Seeds:</u> | | | |
| Hybrid | P m | p p | p m |
| local | m p | a a | a m |
| Fertilizer | p m | p p | p m |
| <u>Poultry:</u> | | | |
| Chicken | p a | a a | p a |
| Rabbits | a a | a a | p p |

KBU = Kiambu, KWL = Kwale, Projects/H = projects at home,
 p = present, a = not present, m = mixed e.g. some
 apply fertilizers some don't.

On the school farm coffee and tea were also grown. Communities in Kiambu had extensive farms where the same crops in addition to potatoes, bananas, yams, and beans were grown as food crops. Coffee, tea, pyrethrum etc. were grown as cash crops. The type of maize and vegetable seeds used in the school gardens were the same as those used in community farms.

In Kwale, the opposite was the case, where for example, maize and vegetable hybrid seeds were used in school gardens, farmers in the community who mostly had small plots, used traditional seeds to grow mainly maize, sim sim and cassava on small pieces of land. Cashew-nuts and coconut trees were common trees in both the school compounds and in the community. The parents in Kwale pointed out that they use traditional seeds because their environment is not suitable for "modern" seeds, the district has a dry and hot climate. At the same time, the seeds are not commonly available in the region and money to purchase fertilizers and chemicals, in addition to seeds, is not available.

Food crops like potatoes, yams, fruits, animal feeds etc. were common in the catchment areas, but non-existent in

school gardens. This also applied to livestock. In both regions, no school had bee, poultry or fish farming projects. The lack of practical projects made the teaching of these topics purely theoretical, by being taught only in the classrooms.

More than 60 per cent of students in school A and B had small agricultural projects (shamba) at home. Students' agricultural projects at home were either small gardens with vegetables, or poultry projects with chicken or rabbits. In the two schools in Kwale district, less than 30 per cent of students had such projects; the majority of these were students whose parents originated from more agricultural fertile areas up-country (inland). One Standard VIII student, a Kikuyu, whose parents were running a shop and a restaurant business, kept 25 rabbits for commercial purposes. In these projects students tried to experiment with what they learned in school

Table VI shows agricultural methods and practices used in community farms, school plots and in students' agricultural projects at home. Some of the agricultural methods and practices-principles of planting distances, line planting, pruning, fertilizing - applied in community farms

in Kiambu district were observed in school gardens. This was not the case in Kwale where the above practices were common in school gardens and not in community farms.

Table VI

Agricultural Methods and Practices in Home Farms,
School Plots and Students' Home Projects

| <u>Methods & practices</u> | <u>Kiambu</u> | | | <u>Kwale</u> | | |
|--------------------------------|---------------|--------------|-------------|--------------|--------------|-------------|
| | <u>Hme.</u> | <u>S/PL.</u> | <u>SPH.</u> | <u>Hme.</u> | <u>S/PL.</u> | <u>SPH.</u> |
| Single-cropping | a | p | a | a | p | a |
| Inter-cropping | p | a | p | p | a | p |
| Crop-rotation | a | p | a | a | a | p |
| Line-planting | p | p | p | a | p | p |
| Pruning | p | p | p | a | p | a |
| Spacing | p | p | p | m | p | m |
| Shifting cultivation | a | a | a | p | a | a |

Hme = home (family) farms; S/Pl = School Plots;

SPH = Students' agricultural projects at home.

P = practiced. a = not practiced.

m = mixed (some practice, some don't).

Some techniques like single cropping, crop rotations, mulching, were observed in school gardens but not in community farms. In Kiambu inter-cropping was practiced particularly with food crops. The single cropping method was only observed in cash crop farms where it is required by law. Farmers are prohibited from inter-cropping, for example, coffee with other crops for fear that this would reduce the quality of coffee. Otherwise, the parents felt that if allowed, they would apply inter-cropping techniques even on coffee farms to make the maximum use of the limited land they have.

Generally, the methods used by students in their home agricultural projects related to what was observed in school plots or what they were taught in class. However, inter-cropping, which has proved useful in community farms, was a departure from what was stressed in schools, i.e. single-cropping. Students seemed to have been influenced by community practices.

The students agricultural projects at home, although tiny in size, are significant for they indicate how students tried to put into practice the principles learned in school. They are also important for they show how students are

influenced by both the school and the community in what they grow and practice. Home plots also provide the unique type of extra school learning opportunities available in local communities, which in some cases, are better equipped in terms of infrastructure. As indicated in Table V, the crops grown in students home projects - vegetables and maize - were related to those grown in the school gardens. Although there were no rabbits and chickens in the school, such agricultural projects were popular with students in both communities because they provided a source of petty cash. Interviews with students indicated that they were motivated during in-class teaching to experiment with rabbits and chickens at home, wanting to find out whether they could manage to earn some pocket money. Such projects were more successful in Kiambu because of the ready market in Nairobi. Market and reasonable prices for agricultural products are crucial for the success of agricultural practice and development in communities in Kenya. This implies that the teaching of agriculture alone is not enough in enhancing students' capacities for agricultural practice.

The foregoing discussion demonstrates that while agriculture lessons often suffer from a number of understandable handicaps, many teachers were able to impart

vital information as well as linkages between the theoretical as well as practical. This task was evidently much easier in Kiambu where local agricultural practices reflected and thus supported what was taught in school. Unfortunately, the constraints under which all teachers operate, seem to have more impact in those parts of the country, such as Kwale, that would be better served by a general encouragement of teachers to be innovative and creative.

By effective teaching of agriculture in schools, it is possible to supplement home knowledge by giving additional general and specific knowledge and skills, for example the ability for efficient farm management, to keep records, to collect information and to handle agricultural technologies. However, whether or not the school will play this role well or poorly depends largely on the improvement of the quality of primary schooling. This issue is examined in the next chapter.

CHAPTER FIVE

STRENGTHENING THE TEACHING OF AGRICULTURE

This chapter discusses the strengthening of agriculture instruction in the overall context of Kenya government's aim to improve agricultural practice. The first section of the chapter presents the data obtained from teachers, students and parents who were involved in the study. The second section examines ways that the quality of instruction in general and of agricultural instruction in particular might be improved, taking into consideration the very real economic constraints facing Kenya and other African countries.

Improving Agricultural Instruction: Opinions of Teachers, Students and Parents

Teachers

Agriculture and Science teachers (N = 62) in the four schools studied were interviewed informally. Several open-ended questions were presented to the teachers. The questions centered on: a) the rationale for teaching agriculture in primary schools, b) the problems teachers face in teaching agriculture, and c) the improvement of

agricultural instruction. These questions provided teachers with opportunity to debate a number of issues relating to agricultural education.

All sixty-two teachers interviewed viewed agriculture education as an important aspect of rural development. Teachers indicated that the government's effort to enhance the acquisition of basic practical skills and to promote positive awareness of agriculture through schooling, is a move in the right direction in solving the problem of unemployment and rural-urban migration, although they felt that a lot has yet to be done. Several reasons were given by teachers in support of agricultural instruction. Teachers' opinions on the question "why should Agriculture be taught in primary schools?" are shown in Table VII.

The responses indicate teachers' feelings that agricultural instruction in primary schools has a role to play, mainly because it enhances students' capacities to acquire scientific agricultural knowledge and skills, and also promotes awareness of the importance of agriculture in Kenyan communities. There is a feeling that agricultural instruction has the possibility of motivating students to practice agriculture and promote its development.

Despite the fact that teachers support agricultural education, they face many problems which have direct impact on agricultural instruction and the influence schooling may have on students.

Table VII

Teachers' Responses to the Question: "Why should Agriculture be taught in Primary schools?"

| Responses | Frequency | % of teachers |
|---|-----------|---------------|
| 1. It helps students to acquire scientific agriculture knowledge and skills | 35 | 56.5 |
| 2. It promotes awareness of the importance of agriculture in Kenyan communities | 29 | 46.8 |
| 3. It increases students' respect for agriculture and rural life | 15 | 24.2 |
| 4. It makes students be self-reliant after school by engaging in farming | 12 | 19.4 |
| 5. It demonstrates that agriculture is a good job and has constant returns | 5 | 8.1 |
| 6. It helps students to run their own agricultural projects | 2 | 3.2 |
| | 98 | 158.3 |

* Tchs = Teachers (N=62)

** Some teachers gave more than one response

Table VIII shows the specific responses of teachers when they were asked "to list three main problems they face in teaching agriculture."

Table VIII

Problems Faced in Teaching Agriculture
as Indicated by Teachers

| Problems | Frequency * | % of teachers |
|---|-----------------------|-------------------------|
| 1. Lack of agricultural equipment, teaching aids and facilities | 40 | 64.5 |
| 2. Lack of textbooks, shallow texts, poor distribution of books | 23 | 37.1 |
| 3. Insufficient time, congested time-table, few agriculture periods | 22 | 35.5 |
| 4. Students' poor participation and lack of support from parents | 18 ** | 29.0 |
| 5. Lack of funds | 8 | 12.9 |
| 6 The Syllabus is too broad | 5 | 8.1 |
| 7. Lack of enough Teachers | 3 | 4.8 |
| 8. Lack of proper Training | 2 | 3.2 |
| | ----- 121 ===== | ----- 195.1 ===== |

N = 62

* = Teachers were asked to list three major problems.

** = Responses given only by teachers from Kwale schools.

It is clear from Table VIII that the major problems teachers face in teaching agriculture are: 1) lack of agricultural equipment, 2) lack of teaching facilities, textbooks which are also poorly distributed, and 3) lack of enough time to cover the syllabus due to a congested timetable. Teachers in schools C and D in Kwale had an additional problem, that of a negative attitude of students towards agriculture and their lack of motivation. This was attributed to parents' reluctance to participate in agricultural activities in Kwale communities. No teacher in Kiambu schools mentioned this as a problem.

Table IX shows what teachers felt would improve the quality of agricultural education. The results from the table indicate that teachers felt that the provision of agricultural equipment/tools and other teaching facilities, the production and distribution of detailed textbooks, giving agriculture more periods, intensifying training and in-service courses, and increasing agricultural activities should be coordinated and made more efficient. Such changes, could make the teaching of agriculture more effective and useful to students and agricultural development. Teachers in Kwale schools added that educating parents and establishing demonstration farms in local communities to increase

Table IX

Teachers' Responses to the Question: "What would you like to see changed in primary school agricultural education"?

| Responses | Frequency * | % of teachers |
|--|-------------|---------------|
| 1. The Government should supply schools with agricultural equipments and teaching facilities | 25 | 40.3 |
| 2. Agriculture should be given more periods in the time-table. | 18 | 29.0 |
| 3. The Government should establish demonstration farms in Kwale to promote agricultural activities | 16 ** | 25.8 |
| 4. More detailed textbooks should be published and distribution coordinated | 14 | 22.6 |
| 5. Training and in-servicing of agriculture teachers should be intensified | 13 | 21.0 |
| 6. Practical activities should be increased, and land made available for school plots | 12 | 19.4 |
| 7. Farm visits should be introduced and subsidized by the government | 10 | 16.1 |
| 8. Agriculture should be separated from science in the time-table | 4 | 6.5 |
| | ----- | ----- |
| | 112 | 180 |
| | ===== | ===== |

N = 62

* = Teachers were free to suggest as many changes as felt necessary.

**= response by Kwale teachers only.

participation in agricultural activities should be a major government priority in Kwale district. Teachers' proposals regarding what they would like to see changed are in line with the problems they face in teaching about agriculture.

There was a division between teachers in schools A and B (Kiambu) and those in schools C and D (Kwale) on whether they felt that schooling enhances students' ability to apply what they have learned in school to agricultural practices at home (Table X).

The Majority of teachers in Kiambu schools felt that school has a positive influence on students' application of what is learned in school in agricultural activities at home. This is because students seem to be motivated by what they are taught and put into practice what they learn in school. The fact that students have, for example, rabbit projects at home, which are taught in school and not popular among adult farmers is an indication of the influence the school might have. Teachers in Kwale schools however indicated that the school has no influence because students do not get support from their parents who are not keen in agricultural activities. Thus, students develop negative attitudes and do not engage in farming or animal husbandry at home.

Table X

Teachers' Responses to the Question: "Do you think school enhances students' ability to Apply what they learn in agricultural practice at home?"

| Responses | Frequency | % teachers |
|---|-----------|---------------|
| 1. Yes, because students are motivated by what they are taught and try to practice what is learned in their projects | 43* | 69.4 |
| 2. Yes, students usually trust teachers and follow what they are told to do | 5 | 8.1 |
| 3. It depends on whether they (students) have plots to apply what is taught | 10 | 16.1 |
| 4. No, their (students') parents don't practise farming. Students don't have the opportunity to apply what is learned | 20 ** | 32.3 |
| 5. No, students don't have time and most of them are not experienced. | 2 | 3.2 |
| | ----- | ----- |
| | 80 | 129.2 |
| | ===== | ===== |

N = 62. Some teachers gave more than one response.

* = Only three teachers in Kwale gave this response

** = No Teacher in Kiambu schools gave this response.

Students

Eighty students (20 from each school) were also interviewed. The questions focused on three basic issues: a) students' opinions on agricultural instruction, b) problems

they face in learning agriculture, and c) students' aspirations.

The majority of students - 30 (75%) students in Kiambu schools and 35 (87.5%) students in Kwale schools - were satisfied with the way agriculture was being taught in their schools. Ten (25%) students from Kiambu and five (17.5%) students from Kwale schools indicated that they were not satisfied with agricultural instruction. The following reasons were given for the dissatisfaction: 1) lack of time for practical work, 2) lack of textbooks, agricultural tools and land for practice, and 3) teaching is too theoretical.

When asked to state what they gain from agricultural instruction, students expressed various opinions (Table XI). The results from the table XI show that the students felt that they gained more basic agricultural knowledge and skills which would help them engage in agricultural activities. The Students connected agriculture instruction in school to agricultural practice at home. However, they were divided in terms of region when asked to indicate how they apply agricultural knowledge in their communities.

Table XI

Students' Responses on the Question: "What do you gain from Agricultural Instruction?"

| | Frequency | % of students |
|---|-----------|---------------|
| 1. Learning more about agricultural practice and technologies | 38 | 47.5 |
| 2. Helps one to grow crops and keep animals | 10 | 12.5 |
| 3. One is able to participate in farm work at home | 8 | 10 |
| 4. Prepares one to become self-reliant | 5 | 6.3 |
| 5. Helps one get income from his/her own plot | 3 | 3.8 |
| 6. One learn how to make and maintain farm tools | 3 | 3.8 |
| | ----- | ----- |
| | 67 | 83.9* |
| | ==== | ===== |

N = 80

* = Some students did not respond.

The students from Kiambu schools indicated that they apply what is learned in school by working in their own agricultural activities (Table XII) and helping their parents perform various agricultural chores.

Table XII

Responses of Student in Kiambu on How they
Apply what is Learned in School

| | Frequency | % of students* |
|---|-----------|----------------|
| 1. By working on my own agricultural plot/project at home | 35 | 87.5 |
| 2. By helping my parents with planting, weeding, and/or feeding animals | 20 | 50.0 |
| 3. By working on farms | 11 | 27.5 |
| 4. By Advising parents on how to use fertilizers and chemicals | 4 | 10.0 |
| 5. By looking after cattle | 2 | 5.0 |
| | ----- | ----- |
| | 72 | 180.0 |
| | ===== | ===== |

N = 40

* = Some students gave more than one response.

In contrast, the majority of students (70%) in schools and D in Kwale indicated that they do not apply what is learned in school. The major reasons given were: 1) agriculture is not popular in the community, thus students not motivated to engage in farming, and 2) lack of

agricultural resources. Those students who indicated that they apply what is learned, pointed out that they do so by working on their own agricultural projects, for example, keeping rabbits.

As mentioned earlier, the majority of students in schools A and B had small agricultural projects at home. They tried to put into practice what was learned in school. It was observed that in most of the projects inter-cropping was practiced. This seems to reflect the influence of community farming more than the school. Apart from growing vegetables, the students also had some interesting agricultural projects like the keeping of chickens and rabbits. It was observed that such projects were divided along gender lines, where girls tended to have projects on gardening while boys would keep rabbits, chicken and at the same time do gardening.

Students were asked to indicate where they think they have learned more agriculture. The results are summarized in Table XIII. Twenty five (62.5%) students in Kiambu schools indicated at home, while 15 (37.5%) students mentioned the school. Thirty (75%) students in Kwale schools indicated they have learned more agriculture in school, and only ten

(25%) students mentioned home.

The responses show the effect of the economic and social environment on agricultural teaching. Since agriculture is an established occupation in Kiambu communities, the students felt that they learned more agriculture from home, as opposed to the students from Kwale, where agricultural activities are not developed. Thus, a greater degree of this agricultural knowledge was acquired at school.

Table XIII

Differences by District of Students'
Indication of Where They Learned more about Agriculture

| <u>District</u> | <u>Number learning more at</u> | |
|-----------------|--------------------------------|---------------|
| | <u>Home</u> | <u>School</u> |
| Kiambu | 25 (62.5%) | 15 (37.5) |
| Kwale | 10 (25%) | 30 (75%) |

To find out whether the students valued agriculture as an important occupation after school, each student was asked

to indicate what s/he would like to do if s/he would not be promoted to secondary school. Thirty six (90%) students in schools A and B (Kiambu) indicated that they would like to take up farming. Metal work, tailoring, primary school teaching, and carpentry were each mentioned by one student (2.5%). Reasons for engaging in farming are summarized in Table XIV.

Table XIV

Reasons for Taking up Farming if not promoted to Secondary school as indicated by Students in Kiambu

| Reasons | Frequency | % of students |
|--|-----------|---------------|
| 1. More profitable than most occupations | 15 | 37.5 |
| 2. Be sure of constant supply of food | 6 | 15.0 |
| 3. Farming has constant returns | 5 | 12.5 |
| 4. Generally like it, I will get assistance from parents | 5 | 12.5 |
| 5. Difficult to get other jobs | 5 | 12.5 |
| 6. Have basic agricultural knowledge and skills | 3 | 7.5 |
| | ----- | ----- |
| | 39 | 97.5 |
| | ===== | ===== |

N = 40

In schools C and D in Kwale, only fifteen (37.5%) of students indicated that they would take up farming. The major reason was that agriculture is open to primary school graduates more than other jobs and is also a source of food. Working in hotels, being a carpenter, doing tailoring, being a motor mechanic and being a teacher were each mentioned by five (12.5%) students. One (2.5) student mentioned nursing. The fact that agriculture is not a well established sector in Kwale did not deter a number of the students from mentioning farming as their preferential occupation.

Major activities/occupations in the community seem to have influenced students' responses on what they would like to do after primary education. Students in Kiambu saw agriculture as the most ideal and profitable occupation because of their experience in the community, where agriculture has proved very profitable. On the other hand, students in Kwale mentioned several options including working in hotels which is a common employment opportunity to school graduates along the Coast because of the tourism industry.

Table XV shows students' responses when they were asked to indicate the problems they face in learning agriculture.

Like their teachers, students pointed out various problems, including lack of school plots, agricultural tools and textbooks. Lack of time is another hindrance. Students also felt that three agriculture periods per week are not adequate for the effective learning of the subject.

Lack of teaching resources has implication for teaching and learning agriculture. Students indicated that they would gain more from agricultural instruction if resources were provided, and they were given time to do practical projects in school gardens.

Table XV

Problems faced in Learning Agriculture
as indicated by Students

| | Frequency | % of Students |
|---|-----------|---------------|
| 1. Lack of school gardens/space for practical activities | 40 | 50.0 |
| 2. Lack of agricultural implements/tools | 35 | 43.8 |
| 3. Lack of textbooks | 30 | 37.5 |
| 4. No time for practical activities | 15 | 18.8 |
| 5. Teaching is mostly theoretical, thus difficult to understand | 8 | 10.0 |
| | ----- | ----- |
| | 128 | 160.1* |
| ===== | | |

N = 80. * Some students gave more than one response.

Parents

Forty parents from the schools' catchment areas (20 from each district) were also interviewed. The central questions focussed on a) parents' reaction to agricultural instruction in schools, b) relationship between what is taught in school and what children learn at home, and c) how to improve the teaching of agriculture.

All the parents interviewed, in both Kiambu and Kwale, were aware that their children are taught agriculture in schools. Twenty two (55%) parents indicated that agricultural instruction should be encouraged because it helps students learn more about agriculture. Twelve (30.0%) parents expressed the opinion that agricultural instruction is good but it should be taught well and practical activities should be encouraged, while six (15.0%) of the parents indicated that agricultural instruction is good because it prepares students for future occupation and to be self-reliant. It was interesting to note that even parents in the Kwale district, where agriculture is not developed, felt that agricultural instruction is important for their children. This may be attributed to parents' positive attitudes towards

schooling in general.

The majority of parents (85%) in Kiambu communities felt that there was no contradiction between what the school teaches about agriculture and agricultural practices in the community. However, the parents in Kwale found this particular question and others related to application of agricultural technologies difficult to answer. The only salient difference to them is that school agricultural instruction is mostly in theory, while at home agricultural activities are practical and children have to do their work practically.

The parents, especially in Kiambu, indicated that mixed farming and/or inter-cropping is a relevant farming method in their community. This is because they have been practising it for several years in their small pieces of land and have come to appreciate its profitability. The parents also appreciated the fact that schools stress the development of agriculture. However, they did not agree with the idea that single-cropping is the best method of farming. This was supported by the activities observed. One parent summarized it all: "how do they expect us to get enough food and income from this small piece of land of mine? I have to use this

one intensively" (Parent, Kiambu 1989).

The parents in Kiambu believed that they give their children enough opportunities to practise farming and apply what they have learned in school. Apart from helping their parents in family farms, most children have their own small agricultural projects where they do some gardening or keep rabbits and chickens. Lack of land, fertilizers and chemicals are the major problems.

When asked to indicate what they think should be done to make students like agriculture, which would encourage them to support its development as a useful occupation, parents had various suggestions which echoed the concern of teachers (Table XVI).

Active participation of students in agricultural activities coupled with retention of profits accruing from such activities seem to be crucial to parents. In addition, they felt that, students have to be provided with necessary agricultural facilities, for example, tools, seeds, fertilizers and chemicals.

Table XVI

Parents' Suggestions of What should be done to
make Students like Agriculture

| | Frequency | % of Parents |
|---|-----------|-----------------|
| 1. Students should be allowed to retain profits from their agricultural projects in school as well as at home | 22 | 55.0 |
| 2. Each student should have an agricultural plot at home | 18 | 45.0 |
| 3. Students should be provided with agricultural facilities: tools, seeds, fertilizers, chemicals etc. | 15 | 37.5 |
| 4. Teachers should make follow-ups and supervise students' projects | 8 | 20.0 |
| 5. Parents and teachers should work together with students in community farms | 5 | 12.5 |
| | 60 | 100.0 |

N = 40

The parents expressed the opinion that such measures are likely to motivate students to appreciate agricultural instruction and practice, and hence be committed to its development.

Students' aspirations were supported by parents' responses. Responding to the question "what would you like your children to do if they fail to join secondary school?", twelve (60%) parents in Kiambu indicated that they would like their children to engage in farming. The major reason given was that farm products have a guaranteed market and one is assured of constant food supply. Five (25%) parents indicated that they would like to take their children to technical schools to acquire more technical skills; while two (10%) parents mentioned tailoring and one (5%) indicating typing.

In Kwale, seven (35%) parents mentioned farming; five (25%) parents would like their children to join technical schools; working in hotels and going to Mombasa to look for a job was each mentioned by four (20%) parents.

It is clear that the majority of parents do not aspire for their children to go to urban areas to look for jobs. Such a feeling discredits the notion which has been common in Kenya in the last decade. Acquisition of practical skills by primary school graduates seems to be important to parents because this would help children become self-employed or able to find salaried employment locally. Parents also believe

that children can only stay in rural areas if they have positive attitudes towards agriculture and have the necessary knowledge and skills. Towards this end children have to get support both from home and school.

The analyses of opinions from teachers, students, and parents have indicated that there has been a positive reaction and a desire for agricultural instruction as a useful and necessary inclusion in the primary school curriculum. Such support is significant for, not only what it illustrates about the possibility of effective teaching of "modern" principles of agriculture, but also for effective use of what is learned in actual practice.

Improving School Quality

As detailed in chapter four, the teaching of agriculture is constrained by various factors. In particular, agricultural syllabus and examination (KCPE) orientation continue to restrict the content of what is taught as well as the teaching methods. In addition, ecological realities affect how classroom theory is translated into practice. Many of the constraints are not particular to agriculture,

they apply to other subjects as well (Cleghorn et al 1989; Eisemon and Abagi, 1988).

In order to strengthen the teaching of agriculture and make the subject more useful to students, the quality of primary schooling must be improved. This involves, in addition to support from teachers, students and parents, modification of the agricultural curriculum, increasing school resources and changes in school instruction, and assessment policies that promote understanding and effective application of the principles of "modern" agriculture.

From the realities of Kenyan society, where agriculture is the mainstay of the economy and primary schooling is terminal for a majority of students, more resources need to be devoted to improving the quality of primary schooling. On the same note, agricultural curriculum has to focus on innovative agriculture. School instruction should concentrate on providing the rationale behind the application of improved agricultural practices.

The primary school agricultural curriculum needs to be re-evaluated and developed to concentrate on the principles of "modern" agriculture rather than on basic agriculture.

The focus should not be primarily on teaching students how to farm, but making them understand the rationale behind the application of the principles. In the same vein, it is crucial to make primary schooling effective in promoting students' awareness of the role of agriculture in Kenya's economy. Primary school agriculture should be treated educationally not vocationally. It has to be a tool for raising creativity, innovative skills and energy, and a vehicle of knowledge dissemination. What should be avoided is the temptation of making primary schooling exclusively vocational. For example, there is no place for agricultural instruction in school which is only for the production of crops for profits. At the same time, curriculum should not become a tool for depositing "fixed" facts to students.

This shift of focus is important and necessary because basic agricultural skills and techniques required for farming and animal husbandry (vocational training) are learned effectively in family farms, where the majority of children supplement their parents' labor as part of socialization. However, this is more active in areas like Kiambu where there is commitment to agricultural activities. In areas like Kwale, where there is agricultural potential with less participation, school instruction can have a major influence

if the school plots are well developed to offer extension services, not only to students but also to community members. This has to be supplemented with a wide-spread government campaign on awareness-raising in such communities, coupled with demonstration farms.

The incorporation of indigenous knowledge and practice into the curriculum would strengthen the impact the school might have. Making such knowledge part and parcel of innovative agriculture is likely to reduce the discontinuity between the school and home. The agricultural curriculum which overlooks indigenous knowledge and practice is likely to prove less valuable. The ecological factors as well as what farmers do in a given community, must be taken into consideration.

There is a major need to make changes in and modification of instruction to give students more opportunity of internalizing and discussing the theoretical foundations of innovative agricultural practices. This implies that the traditional teacher-centered methods of school instruction have to change to accommodate a student-centered approach. The mode of teaching, for example, the question-answer approach should focus on more than factual information.

Teachers have to improve how they ask their questions so that students are able, for example, to explain a process or a relationship between various variables in agriculture. Such an approach has far-reaching implications for the assessment of policies in general, and on the type of questions which should be on the national examination.

It is now generally agreed that a well-designed examination improves the curriculum, and classroom instruction (Heyneman, 1980, Somerset, 1984). In an examination oriented system, much potential lies within the examinations themselves for altering the manner in which material is taught in the classroom. For examinations to guide students' understanding and application of what is taught, they must be geared towards making students acquire knowledge and skills. In other words, examinations must be based on materials relevant to the experience of students.

What teachers actually say when teaching about new concepts in agriculture and how such concepts are tested in the national examination, illustrates how difficult the process of imparting new ideas to students can be. It is evident, however, that the difficulties can be reduced once the examination questions are geared to promoting

understanding of what is taught, as opposed to simple recall tasks. If this step is taken, it is possible that the pattern of classroom interaction may also change and reflect modes of teaching, which are likely to be child-centered, aimed at promoting construction of ideas and reasoning.

The underlying considerations of reform in school instruction have to do with the possible consequences of the way agriculture is taught for the students' understanding of important concepts. If, for example, students occupy themselves with only basic operations in agriculture in the school plot, for example, digging or weeding, then it is likely that practical instruction will have little effect on the students. This also applies to classroom teaching. The fact is that the majority of students in upper primary classes in schools in Kenya are familiar with basic agricultural activities. Thus, the school has to go beyond basics in order to enhance what students already know from home.

Other subjects taken at school can act as a resource for teachers in making abstract-concrete connections. For example, topics dealt with in health science may fill in information about the use of chemicals. In addition,

materials readily encountered out of school, such as seeds or fertilizers, might supplement the shortages of text while providing samples of the practical reading and comprehension skills needed to follow the instructions for use of such products.

As the foregoing implies, the practice of modern agriculture, even on a small scale, requires the acquisition of some technical knowledge for which literacy and numeracy skills are essential. Apart from the use of new varieties of seeds and the application of fertilizers or herbicides, keeping records of market-oriented production may protect a farmer from being cheated by middlemen.

Relating theory and practice is necessary, but not the key to the success of effective teaching of agriculture. A well organized school plot or farm would be helpful teaching aid for both experiments and real production, particularly in agriculturally poor districts. Students have a better opportunity to become familiar with what is taught the more they put their skills into practice. As mentioned before, experimental lessons not only increase students' participation, but also offer possibilities of developing other general skills, which may be useful in dealing with

agricultural practice and development. At the same time, the context of school plot work has to be coordinated with classroom instruction to make students relate theory to practice. However, efforts need not be put too much on practical activities, as it is the case. In other words, agricultural education at primary level needs to be educational and not for teaching vocational agriculture. With the lack of land and time, too much stress on practical activities would not be viable. The concentration should be on nurturing and enhancing in students those habits, attitudes, knowledge and skills that will make them think positively about, and effectively apply "modern" principles of agriculture, if they become farmers.

Agricultural instruction will make more sense when the school and the community link to each other freely in developing agriculture. Agricultural extension officers should play a liaison role where, for example, they give instruction to a group of farmers and students together in school and in the community. Farmers from the locality need also to be integrated into agricultural instruction programs in schools, where they are invited to give lectures and demonstrations. On the other hand, arrangements could be made for students to visit successful farmers in their

community and beyond. A start in this direction was observed in Kiambu district where many agricultural extension officers and farmers are motivated to improve their productivity.

Agricultural practices in school need not adhere to a specific method of farming, for example single cropping and line planting, or use of "modern" technologies. Flexibility gives students opportunity to experiment with what they learn in school and what is acquired from home. This is because the main aim of primary school agricultural education is not to make the students vocational farmers but to enhance their understanding of the principles of "modern" agriculture and their effective use when they decide to take up farming.

The language of instruction policy for a practical subject like agriculture needs to be flexible to allow the use of both English, Kiswahili and local languages where appropriate. It may be that the teaching of agriculture would be more effective with more use of ethnic languages, the other two languages used as supplements. Through this, there is a possibility of rendering lessons familiar and motivating students to engage in discussion (Abagi and Cleghorn, 1990; Cleghorn et al, 1989; Heyneman, 1980; Mbuyi, 1987).

In general, strengthening the teaching of agriculture in primary schools requires the use of every school activity and resources that can possibly be arranged for this purpose. First and foremost, the teachers must not only have a genuine belief in rural development, but must also have proper training in teaching crucial subjects like agriculture. The first step is the development of real appreciation of the importance of agriculture in society.

There is probably no more vital problem of schooling than that of helping the youths to appreciate the importance of agriculture in the country and how they can participate in its development. Since teachers hold key positions in the lives of students and control school instructions, their appreciation of agricultural education and how they teach it has implications for the ways that students think about and practice agriculture. Teachers are in a key position to contribute important information for the benefit of applying the principles of "modern" agriculture more effectively.

Second, no matter how relevant and organized the curriculum may be, it can not achieve its goals without the availability and adequate distribution of teaching resources

- books, equipment, materials and trained teachers. Primary schooling must be supported by more than just the will, the government has to take control of supplying the schools with necessary resources, which in turn must be used effectively in schools. There is strong evidence that increasing the provision of instructional materials, especially textbooks, is the most cost-effective way of enhancing the quality of primary schooling in Africa (World Bank, 1988). Lack of learning materials is one of the most serious problems faced by schools, particularly those in rural areas. Availability of the learning materials will assist teachers in the organization of classroom activities, and thus increase school effectiveness.

Third, increasing of learning materials must go hand in hand with lifting teachers' morale and dedication. This is because teachers' morale has direct influence on how they think about, and how they conduct their lessons. Primary teachers are generally under-paid and those in rural schools work in poor conditions - poor housing, inadequate school physical facilities, poor supervision. This is compounded by the teaching load the teachers have and what the society expects from them. Therefore, apart from monetary incentives, there must be increased and efficient support and

supervision of teachers. Teachers need to be consulted in matters that affect their work and they have to be given opportunity to improve their teaching capacity. There must be a well coordinated supervision program to advise and guide teachers. In short, the aim should be to improve the working condition, both in and outside the school. Such measures are likely to motivate teachers to use the school time and learning resources effectively, and thus improve the school quality.

Fourth, strengthening the role of primary schooling requires more than improvement of school quality. There must be structural transformation of rural areas. This includes the development of not only agricultural sector, but other primary and secondary sectors as well. In this study we concur with Bacchus's statement that

attempting to make radical changes in the educational system and curriculum content of schools ... without affecting corresponding changes in their social and economic structures will be like hitting one's head against a brick wall

(Bacchus, 1981, p. 120).

A viable agricultural educational policy and program cannot be formulated in a vacuum. A government which advocates such policies must also be committed to the development of all sectors of the economy. In particular, different sectors

must be linked to form a coherent economy. More crucial agricultural policies must provide incentives to prospective and practicing farmers. These are policies dealing with prices, loans, markets, land policy and general infrastructure. Once these basic factors - "essentials", are available, "accelerators" - education, credit, group action, land and planning - can increase their effects in promoting positive attitude towards agricultural practice and development (Mosher, 1971). This means that government policies, planning and practice have to create a reasonable environment to enable schools to have a relevant impact on development activities. The reforms within the education system should not concentrate only on curriculum changes, but should encompass other sectors as well.

Being pre-occupied with the exodus from rural areas, which is only a symptom of unbalanced development, is denying the economic realities in the country. Unless employment opportunities and prosperity in general are relatively evenly spread, we can not prevent people from moving in search of salaried jobs in urban areas. Therefore, planning the provision, content and structure of education to satisfy any societal objective without regard for actual realities of socio-economic conditions and without full understanding and

appreciation of purposes of the school as understood by the people, is likely to be ineffective.

These reflections should not be taken to apply only to schools in rural environments. But it must be recognized that they apply to all primary schools in the country, both in rural and in urban areas. All children in Kenya need to learn the principles of "modern" agriculture because the economy of the country depends on this sector and a majority of students, not only those who terminate their schooling at primary level, but even those who finish secondary schooling, are absorbed directly or indirectly in agricultural related activities. The children must learn about the growth and management of plants and animals, how food is produced and marketed, and more importantly how agriculture is linked to the development of the country.

In sum, strengthening the teaching of agriculture involves not only the improvement of school quality, in terms of school resources and instruction related activities, but also the transformation of the rural economy. Such a commitment would strengthen the capacity of primary schooling not only in teaching the principles of "modern" agriculture effectively, but also in the way the school can influence how students think about and practice agriculture.

CHAPTER SIX

SUMMARY, CONCLUSION AND DISCUSSION

Summary

This study dealt with the question of whether the principles of modern agriculture can be taught effectively in Kenyan primary schools. To do so, it focussed on the teaching of agriculture, in and outside the classroom (in school plots), as well as with the linkage between agricultural instruction and community practice. Ultimately, the study sought to determine ways to strengthen the teaching of agriculture, to improve agricultural practice.

The study was carried out in primary schools in two districts of Kenya: 1) Kiambu, which is a rich agricultural district, and 2) Kwale, which has agricultural potential but in which practices are not as developed as in Kiambu. Ethnographic methods were used to examine and analyze standards VI and VIII agricultural instruction in classrooms and in school plots/gardens, and to explore how the instruction related to community agricultural practices. The inductive approach was used in data analysis and samples of

classroom dialogue became part of the report.

Despite the abundant literature on the role that primary education should and can play in rural development in general, and in agriculture development in particular, studies which address the mechanisms or processes through which schooling affects the understanding and application of what is learned in school, are still scarce. As discussed in chapter I, existing studies show disparities and also tend to ignore the internal dynamics of the school and their structures. The use of such findings as the basis for policy changes in education and rural development has thus created problems and increased controversy over the actual or potential role of primary schooling on agricultural productivity.

It has been shown in Chapter III that the history of agriculture education in Kenya goes back to 1925 when it was formalized in African schools following the recommendation of the Phelps-Stoke commission. At independence in 1963, however, agriculture was incorporated into the teaching of science, thus its importance as a separate subject was downplayed.

In the 1970s the government embarked on education policies and programs which were aimed at curbing the increasing problems of rural-urban migration and unemployment of the educated. With the implementation of a new system of education - 8-4-4 - in 1985, primary schooling and agriculture education became an important feature of development policy. Agriculture was restored as a separate subject and became examinable. It was hoped that agriculture education would facilitate agricultural development, thus increase food production and foreign earnings. To this end this study was designed to examine how principles of "modern" agriculture can be taught effectively in the primary schools.

The findings of this study indicate first, that there are major constraints to the effective teaching of agriculture, as is the case for other subjects. They include: the dictates of the agriculture syllabus, the influence of the examination (KCPE), ecological factors and the lack of facilities. Second, the findings show that classroom instruction, although generally geared towards the national examination, the KCPE, offers the possibility of enhancing students' understanding and the effective use of what is learned in school programs. For example, the ability to make sound decisions, to keep records, and to manage

agricultural resources are skills that can be enhanced through agricultural instruction. Third, there is much scope for increasing the capacity of primary schooling to teach the principles of "modern" agriculture more effectively. The extent to which the school will do this depends on the improvement of overall school quality, the efficient distribution of resources, and modification of teaching strategies as well as student evaluation procedures. Lastly, the role of schooling in improving agricultural practice is dependent on the serious transformation of the economy so that incentives to practice agriculture are increased.

The pattern of instruction for implementing the curriculum was quite similar in all four primary schools. A highly teacher-centered approach was observed in which the focus was on the preparation of students for the end-of primary examination. As a result the contents of the syllabus were rarely deviated from. While such teaching strategies may result in good examination performance, they may not go far in improving how students think about and practice agriculture at home.

Despite the constraints on instruction, there was much that was positive. For example, the information given to

students about modern technologies, about the distribution of agricultural produce, and about agricultural support services was consistently good. There was little effort however to deal with indigenous knowledge and practices during instruction.

Most teachers were observed to use English, the official medium of instruction in a flexible way along with Kiswahili and the local mother tongue. Such language practices are deemed, in Kenyan context, to facilitate the giving of explanations, for example, and overall, to assist in making the content of lessons more meaningful.

There was a clear indication that the agricultural curriculum seems to work best where agriculture is most developed. For example, in Kiambu, students have better opportunities to know and practice what is learned in school because of the developed agricultural environment and the community's interest in agriculture. However, in areas like Kwale, where agriculture is not developed, the community may learn and acquire various agricultural practice and technologies from a well organized and established school plot. That is, school plots in such districts could have an extension function.

Contrary to the popular belief of some researchers and educators that vocational-technical education is unpopular among teachers, students and parents (Blaug, 1973; Fafunwa, 1973; Foster, 1965), the study found that the teachers, students and parents felt that the re-introduction of agriculture into the primary school curriculum was the right move. There was a feeling that agricultural education would be more useful if it is taught effectively. The availability of teaching resources, and their efficient use, is crucial if schooling is to supplement what students learn practically in their homes.

Although school graduates generally aspire for salaried employment, evidence from the study suggests that they are not unwilling to turn to farming. Instead of aspiring for white collar jobs in urban areas, the majority of primary school students (supported by parents) know what is feasible for them and would like to remain in rural settings where they feel they would engage in useful and productive occupations. These findings confirm those of Shiundu (1986) and Robson (1987), who noted that it appears that primary schooling does not necessarily lead to alienation from rural life. The study concurs with Robson's (1987) conclusion that

"students are pressured into urban migration by social and economic factors in the villages, but there is little evidence of actual disenchantment with village life" (P. 86). Evidence from this study confirms that even if there is attraction for salaried jobs, primary school students would prefer to work in their communities. This has important implications for policies on education and rural development in Kenya.

Conclusion and Discussion

The overall impression emerging from this research is that primary schools in Kenya have the potential of teaching the principles of "modern" agriculture more effectively. I should like to conclude this thesis by proposing, in the first instance, that agriculture education is an important ingredient of primary education which is terminal to the majority (about 60%) of students. To ignore the occupation in which 85 per cent of Kenyans participate is to deprive primary schooling of a rich dimension. In the second instance, principles of "modern" agriculture can be taught effectively in primary schools. In order to do this, the quality of primary schooling in general must be improved. Attention must be paid, not only to increasing and supplying school resources, but also to improving instruction which

includes changes in the way the acquisition of practical knowledge and skills are evaluated. To begin, the kinds of questions asked on the examination need to be altered so that teachers will gear instruction towards fundamental processes.

The most effective argument against agricultural instruction would be the concerns of parents. Since parents, together with teachers and students, support agriculture in schools, the impact of agricultural instruction would be great if supported by reasonable policy and adequate resources. The fact that the students, particularly from Kiambu, have their agricultural projects at home, separate from family farms - a departure from traditional practice - where they can experiment with what is learned in school, is an indication that schooling can have some positive influence in agricultural practice and development. The agricultural projects and school-community linkage are significant for what they illustrate about agricultural instruction and actual agricultural practice.

The implication of these findings is that agriculture education can be established as an entirely viable pedagogic system aimed at promoting the understanding and effective use

of principles of "modern" agriculture. This is contrary to what propagators of "the vocational school fallacy" in Third world countries would like us to believe (Blaug, 1973; Fafunwa, 1973; Foster, 1965; Psacharapoulos, 1986; Psacharapoulos and Loxley, 1985; Simkin, 1977). The "fallacy" debate which gained ground in 1960s has continued, but it has not gained much support by many governments (China, 1983; CIDA, 1988; Kenya Government, 1988; Metcalf, 1985; Lauglo, 1985), as pre-vocational and vocational education has become increasingly popular in Third world countries. This is largely due to the decrease in employment opportunities of white collar jobs and the reduction in income gaps even between small scale commercial farmers and lower level employees in the public or private sectors.

Although we agree with proponents of the "fallacy" theory that agriculture education is no panacea to rural development or the problem of unemployment, our major disagreement lies on the "strategy" that they propose:

agriculture education ... should not be primarily directed at school children but participating adult farmers who are already committed to life in Agriculture and for whom instruction promises a real rise in their level of well being

(Foster, 1975, p. 385).

Such a strategy ignores two major realities. First, children

are more open to change or new innovations than adults.

Freyhold (1979) after studying the implementation of "Education for Self-reliance" in Tanga - Tanzania, concluded that:

primary schools are unique instruments for informing people about national objectives and beliefs, since children who still have some hopes that they might be chosen to work in institutions at the centre of political and economic systems can be expected to listen more carefully to general issues than adults

(Cited in Bude, 1985, p. 152).

This implies that by focusing on school children there is a possibility of shaping the way prospective farmers think about, and will practice agriculture.

Second, the argument against teaching agriculture in primary schools reflects the general attitude of underrating the impact or influence of the school, as if the school is a useless institution. Relying wholly upon Adult (Informal) education and Extension Services to convey principles of modern agriculture is a restrictive and even unrealistic "strategy" in Kenya. Extension officers may be numerous in some parts of rural areas, but the services they provide are mainly directed to cash cropping and to simple information about such matters as line-planting, seeds, spacing, the use of fertilizers etc. However, extension

officers are not in a position to offer complex instruction about keeping farm records, farm management, marketing etc. Such knowledge can be developed early in school, and supplemented by extension services. In this way, extension services becomes a complement of schooling, not a substitute.

The general conclusion by those who are opposed to practical instruction that practical subjects, in Third World countries, has tended to be counter productive should be taken with caution, particularly when such conclusions are generalized to countries like Kenya where primary schooling is terminal for the majority of students, many of whom remain in rural settings where agriculture is the predominant occupation. Since the Kenya government and the public are investing heavily in primary education, to continue debating the actual or potential role of the school in rural development seems to be irrelevant. It is important to remind ourselves that the school itself neither pushes school graduates to urban areas nor creates disenchantment with rural life, nor does it promote an overwhelming aspiration to choose farming under any circumstances. However, evidence has shown that school instruction has some influence on how students think about, and practice agriculture, particularly when the environment is suitable for innovations. Thus it is

important to focus on elements which could make the school effective in this role.

Twenty-seven years after independence, Kenya has undergone a major socio-economic transformation. Both parents and students are aware of their likely fate and aspirations and their actual decisions are based on pragmatic realities of their environment, society and economic options available to them; where for example, the majority of primary school students know that they have high chances of engaging in economically viable activities (with constant income) if they remain in rural areas and join the agricultural sector. A case in point is in a district like Kiambu where agriculture is developed and is a profitable occupation.

The new education system in Kenya, 8-4-4, has increased the content and value of agricultural education. This alone is useful for rural development in general and agriculture development in particular. If properly organized and effectively implemented primary agricultural education can be of greater value not only to students but also to societal development activities as a whole. For example, the ability to fully understand the instructions for using chemicals, to keep farm records and to make simple calculations relating to

agriculture are important elements of schooling which can improve farm out-put.

Primary schooling in general, and agricultural education in particular, deserves more critical attention in Kenya. It deserves concern because it is the only form of formal education a majority of people will receive, and because it absorbs a disproportionate share of government and public investment. The notion of condemning the widespread usage of primary schooling as a base for laying the foundation for practical skills and the suggestion that agriculture should be integrated into other related subjects, like science and geography, need not be generalized to all Third World countries.

This study has indicated that the above conclusions about agriculture and other practical subjects are too facile because the difficulties mentioned as facing practical subjects are also true of other subjects and practical operations in an institutional environment - whether in state farms, corporations or primary school gardens. Secondly, the "failure" of practical subjects to solve the problem of unemployment can not be restricted to the subjects per se - even if this claim is true. It extends to other subjects in

the whole schooling system, which implies that the institution is "non-productive" - a tendency which arises from viewing schooling as a panacea for socio-economic problems in a society. And thirdly, we are still not explicitly told in substantive terms how basic knowledge, skills and attitudes should be imparted to primary school students, since in Kenya, for example, the majority of school graduates terminate their education at this point and remain in their predominantly agricultural villages.

Education for rural development has to take into consideration the dialectic and complex relationships between urban and rural areas on one hand, and agriculture and the industrial sector on the other hand. This is because in a country like Kenya, rural areas are directly connected to urban areas in terms of food, labor, raw materials and manufactured goods. Also, there is a continual shift from rural to urban areas and vice versa.

Policies and research on the role of education in rural development in Kenya must, therefore, identify positive and negative factors of specific situations taking into account communities' basic needs and participation. This will improve the ability to make realistic assessments about

future strategies of development and how they can be incorporated into education. The whole debate and hypotheses on the role the school should and can play must be brought closer to action and practice according to the realities of specific countries. Through this, then, it would be possible to answer the crucial question of "what kind of education for what kind of development?"

Implications for Educational Policy and Practice

The findings of this study have important implications for educational policy and practice in Kenya and other African countries. This is because schooling has the potential of increasing the farmer's inquisitiveness, which can lead to self-discovery of a good farming technique, it has the potential of influencing the choice of values or goals which an individual has and thus the activities directed towards such goals. More crucial, schooling presents a wider arena of freedom - knowledge of alternatives available to a farmer - and provides the vision of decision making and evaluation of alternatives available to him/her. In general, apart from providing basic literacy and numeracy, which is basic for development, schooling has the capacity to influence how individuals act and react to their environment (Bude, 1985; Eisemon, 1990; Robson, 1987).

The question, therefore, is how do educational policies and practices relate to the promotion of indigenous knowledge and practice as a base of rural development? As mentioned before, any educational policy, in African countries, which does not take into account indigenous knowledge and practice is likely to prove ineffective in accelerating rural development. For example, there is increasing attention to the knowledge and capabilities of small scale farmers in rural areas of most Third World countries as a potential basis for sustainable agricultural development (Warren, Slikkerveer et al, 1989). The school programs therefore, have to integrate such knowledge to reduce home-school cultural discontinuities. This is important because students are exposed to two cultures - the school and home cultures - both of which shape their attitudes and practice.

Although Kenyans, strongly value schooling, there is a feeling among parents as well as teachers that traditional cultures (indigenous knowledge and practice) need not be shelved. Where, for example, schooling conflicts with the basic needs of a family, the latter prevails. For example, a poor family struggling to get basic food and shelter will withdraw a child from school because child labour is a useful

supplement to parents' efforts. Similarly, a Maasai family will withdraw a child from school to attend traditional initiations because of the cultural maintenance value of such rituals.

There are cases where politicians and policy makers do not agree on how to harmonize the tension between home and school. In this situation, an increasing number of individuals regard traditional cultures as incoherent and the role of schooling as chaotic and undesirable. The result is the continuation of home-school cultural discontinuities. Social scientists and educators would agree that traditional cultural frameworks have been greatly modified by educational, economic and technological changes. However, the vitality of traditional cultures and modes of production has not greatly declined in Kenya, as well as in other African countries. Yet contemporary theories of educational and social change have been limited in explaining the existence of dualism in African societies. Studies based on equilibrium (structural-functionalism) and conflict paradigms tend to predominantly use input/output models in studying the school functions in society, with little focus on the home/family. This arises from

the functionalist logic in these studies
which has limited their abilities to develop

a sense of social process of analyzing
educational changes

(Rubinson and Ralph, 1986, p. 227).

In pragmatic terms the system of learning and training in rural area, to a large extent, is still based on the home/family. The pastoralists in Southern Rift valley in Kenya or in Central Tanzania, the fishermen in Lake Victoria or the subsistence farmers in Western Kenya, bank mostly on family/home to socialize the youths to acquire basic skills, knowledge and attitudes relevant to participation in social economic activities in their homes. Traditional methods are still used, regardless of the fact that children are also sent to school.

Although schooling has a "tag" of an urban oriented way of life (wage employment), it is seen as an institution which is important for socialization. However, it cannot be wholly relied upon. It is clear from the study that Kiambu and Coastal regions manifest a wide range of environmental and structural characteristics than could ever be accounted for in a single economic paradigm. The explanations assigned to "underdevelopment" of rural peasants often appear to have been derived from a desire of politicians, theoreticians, and elites to explain failures to adapt to

modernity. Such explanations tend to ignore the fact that peasants have better knowledge of their environment and needs, and usually make rational decisions. More crucial, such explanations overlook the fact that the supposedly "conservative" peasants have often adapted the use of new technologies. They do this so long as the technologies do not interfere with the scarce resources and opportunities open to them.

The above point has been explained clearly by Edgerton (1971) who pointed out that people tend to develop and acquire those techniques for the exploitation of their environment which prove the most fruitful in terms of people's maintenance, within the limits of the repertoire of technical knowledge available (Edgerton, 1971, p. 5-6). In most cases the so-called "conservative" or "backward" practices are often rational responses to local conditions and are logical adaptation to risks" (Thrupp, 1989, p. 138). For example, the Kikuyu of Kiambu have applied fertilizers and hybrid seeds more successfully than the Coastal communities because environmental conditions are favorable.

New agricultural technologies may be rejected in cases where they do not fit in with the local environment or

interfere with useful cultural values. For example, hybrid seeds have been rejected by some rural farmers because what is harvested cannot be stored to be re-planted. Hybrid seeds need to be bought every planting season, which means the cash and the seeds must be available at the right time. Small-scale farmers have, successfully used indigenous knowledge and practice in areas such as inter-cropping, pest control, animal husbandry, erosion control and even in agro-forestry. Such locally based methods have not however found their way into agricultural instruction.

The foregoing has implications for the role education can play in rural development. Just to reiterate, the use of education as an agent of development needs proper understanding of the rural society and an accurate analysis of the basic needs. The major wave of ruralization of the curriculum which is now rampant in Third World countries should be taken with caution. This is because the teaching of vocational or practical subjects is not necessarily a guarantee that students' attitude towards wage employment will change. Education for rural development need not concentrate only on 'preserving agricultural population' nor limiting the peasants to a rural way of life. Rural communities, just like those in urban areas, have to be given

opportunities of access and treatment in education. They need both basic skills and knowledge to participate actively in development. More important, rural economies must be improved in terms of resources and infrastructure to make education effective in its functions.

Implications for Curriculum Development and Implementation

In light of the foregoing discussion, there is need for the Kenyan Government, through the Ministry of Education and the Ministry of Technical Training and Applied Technology, to take a firm stand and continue with the transformation of the Kenyan education system as a facilitator of rural development. It is necessary to orient schooling and curriculum policies towards social, economic and political development of the country. This implies shifting away from debates and rhetoric about the vocational education "fallacy." This will require, as already been discussed, a combination of bold initiative and persistent measures involving far reaching changes in traditional educational forms and practices, as well as sizeable changes in the socio-economic sectors.

In a country with different environmental and ecological conditions like Kenya, to cover all agricultural needs and

practices is impossible. That is why in a centrally developed curriculum, it is necessary to expose students to basic agricultural knowledge and appreciation of values which relate to agricultural development. Even in urban areas it is of paramount importance that students, in an agriculturally oriented country like Kenya, understand agricultural activities and the sector's role in developing the nation. Agricultural education can have a positive influence on urban children who do not have much opportunity of staying in rural areas, to acquire agricultural skills. In some ways, schools in towns have the advantage of learning about agriculture because they are richer compared to rural schools, thus able to afford teaching resources and have easy access to agricultural research stations, botanical gardens, nurseries, and demonstration farms which cannot easily be visited by students in rural areas like Kwale. The government policy of making agriculture a compulsory subject at primary level is useful.

Agriculture remains a way of life for most Kenyans, and a major source of foreign currency for the country. Therefore, its development is necessary. This development requires people who appreciate agriculture, who are ready and/or able to practice or support it. This implies that

agriculture has a place in the curriculum. Understanding of the basic principles of "modern" agriculture from an early age is of crucial importance in Kenya.

The significance of the rural environment, the dominance of agriculture and the importance attached to primary schooling in Kenya call for more research on how to make schooling more useful in rural development. The focus should be on identification of specific skills required by primary school graduates for different occupations, and on the analysis of how the school can influence the application of what is learned. In addition, studies should focus on how effective primary schooling is in helping women cope with increasing tasks in the rural areas, particularly in the informal sector, since women already produce about 80% of the country's agricultural produce. Research is also needed on indigenous agricultural knowledge and practices and how they can be incorporated into the school system. Research and development (R & D) projects should be established with an aim of developing integrated programs in poor districts like Kwale to strengthen the role of schooling in such communities.

Apart from the proposals made, the study cannot claim to

offer a complete prescription for effective teaching of principles of modern agriculture. However, the study has shed light on a neglected area - the school dynamics - when examining the contribution of schooling to rural development. At the same time, it has highlighted those areas which need more attention to make Kenya's education more useful in agricultural practice and development.

The task facing Kenyan agriculture in the new decade is formidable indeed. It must cope with the needs of a rapidly growing population, it must have sufficient growth in food crops, it must provide employment for the growing labor force and earn foreign exchange that Kenya needs. Above all, it must fulfill the above while preventing the degradation of natural resources. These challenges require close co-operation of the society and the learning institutions. Through this co-operation, the possibility of agriculture meeting its challenges is great.

The central issue is that the development of rural areas in Kenya, as in other African countries, does not depend on the changing of an education system and making the curriculum more relevant to development needs alone. It also involves investing in agricultural development. This will

expand the economic sphere in rural areas and make schooling more efficient in accelerating development. This investment must be sensitive to local needs, environment, and availability of resources. What is needed is not only agricultural education but also socio-economic transformation of rural areas which can attract more educated people to agriculture.

Although agricultural education is no panacea, a carefully thought-out program supported by realistic national development policies can influence how students' think about and practice agriculture. Because each country starts from a different power and economic basis and has different needs and resources, there is no universally applicable blue-print which is suitable to all African countries. Countries have different routes and approaches appropriate to their unique starting point and cultural heritage. In particular, each country has to create the necessary conditions for development by making all its people active participants in their development. Schooling is only one of the institutions which will accelerate the needed development.

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APPENDICES

Appendix IOBJECTIVES OF PRIMARY EDUCATION IN KENYA

To provide learning opportunities for the child in a co-ordinated primary education program to:-

- 1) Lead to the acquisition of literacy, numeracy and manipulative skills.
- 2) Develop his/her self expression, self discipline, self reliance and utilization of his/her senses.
- 3) Develop ability for clear logical thought and critical judgement.
- 4) Be exposed to meaningful experiences which will lead to enjoyable and successful learning and the desire to continue learning.
- 5) Acquire a suitable basic foundation for the world of work in the context of economic and human resource needs of the nation.
- 6) Appreciate and respect the dignity of labor.
- 7) Develop desirable social standards and attitudes.
- 8) Develop awareness and understanding of his/her immediate environment and foster positive attitude to the other countries and to the international community.
- 9) Grow into a strong and a healthy person.

- 10) Develop a constructive and adaptive attitude to life based on moral and religious values and his/her responsibilities to the community and the nation.
- 11) Appreciate his/her own and other peoples cultural heritage, develop his/her aesthetic values and make good use of his/her leisure time.
- 12) Grow towards maturity and self-fulfillment as a useful and well adjusted member of society.

Appendix IIINTERVIEW PROTOCOL FOR SCIENCE AND AGRICULTURE TEACHERS

- a) What is your comment on the introduction of the new educational system - 8-4-4?
- b) What is rural development? and What is agricultural education as you understand it?
(in principle and practice)
- c) What does agricultural education involve in your school in practical terms?
- d) Why should agriculture be taught in primary schools?
- e) Are you satisfied with the current primary school agriculture syllabus? (Probe).
- f) How do you go about imparting agricultural knowledge and skills to pupils?
- g) What are some of the systematic instructions (activities undertaken) in class and school farm to help pupils acquire agriculture knowledge?
- h) How do you reconcile the prevailing traditional agricultural methods in the community and the scientific methods taught in the school?
- i) Is the school plot used effectively and economically in teaching agriculture? How is it used?
- j) What is the effect of examination (KCPE) on the teaching of agriculture? Should the subject be examined?
- k) What are the pupils attitudes towards the teaching of agriculture and working in the school plot?
- l) What are parents attitudes towards teaching agriculture and their children working in school farms?
- m) To what extent do local agricultural practices affect

agricultural education in the school?

- n) Does the school farm have any influence on community agricultural practices?
- o) Do you think pupils effectively apply agricultural knowledge and skills learned in school?
- p) What role do school inspectors play in improving agricultural teaching?
- q) With your academic and training backgrounds, are you confident in handling the subject.
- r) What major problems do you face in teaching agriculture? What is the relationship between agricultural education in school and agricultural extension services in the community?
- s) What major problems do pupils face in learning the subject? and in applying what they have learned in practical agriculture at home?
- t) There are people who advocate for integrating agriculture into science and geography etc., what is your reaction?
- u) Generally, are you satisfied with the current agricultural education in primary schools?
- v) Do you think the teaching of agriculture and other practical subjects changes pupils attitudes towards urban wage employment? What do you think should be done?
- w) What suggestions do you have for the improvement of agricultural teaching in primary schools?

Appendix IIIINTERVIEW PROTOCOL FOR STUDENTS

- a) What is agriculture as a subject? What does it involve in your school?
- b) Do you like agriculture teaching in your school?
- c) Are you satisfied by the way it is being taught?
- d) What do you gain from the subject?
- e) Why was the school plot started in your school?
- f) How would you describe the school plot? Do you gain anything from it?
- g) If you compare home and school, which one teaches you more about agriculture? Do they teach the same things?
- h) What problems are you facing in learning agriculture in school?
- i) Do you usually apply agricultural knowledge and skills learned in school in your farm activities at home? If yes how?
- j) Do you have agricultural projects in the school plot and at home? If yes, describe briefly what you do in them. If no why?
- k) What do your parents say about agricultural education in your school?
- l) Do you usually help your parents in the farm? What kind of activities do they usually assign you?
- m) Do you usually tell and show them what you are taught in school about agriculture? Do they usually agree to apply what you have told them?
- n) If you do not succeed to join secondary school, what would you like to do? Where would you like to do it and

Why?

- o) Generally, are you satisfied with your schooling?

Appendic IV

INTERVIEWW PROTOCOL FOR PARENTS

- a) Are you aware that your children are learning agriculture in school? How do you know?
- b) How do you react to the fact that they are taught agriculture in school?
- c) Do you think that your children are gaining from the subject?
- d) Do you usually teach your children agriculture? How does this compare to what they are taught in school?
- e) Have you ever visited the school plot in the school where your child goes? If yes what do you think of the plot and what is in it?
- f) Do you give your children opportunity to apply agricultural knowledge and skills they have learned from school?
- g) What type of farming do you consider relevant to your community? How do you know this?
- h) Are there contradictions between the dominant agricultural practices in the community and what is taught in school? How do you resolve them?
- i) The school stresses the application of modern methods of farming, e.g. using hybrid seeds and applying fertilizers. What is your comment on this?
- j) The people in the community have been accused of neglecting modern methods of farming. How do you react to this?
- k) What do you think is required for agricultural

development in your area?

- l) What do you think should be done to make pupils like farming?
- m) If your child fails to join secondary school, what would you like him/her to do - why and where?
- n) What do you think schools should teach?

Appendix V

QUESTIONNAIRES FOR SCIENCE/AGRICULTURE TEACHERS

1. Subjects taught and grades -----.
 Educational background -----. Training -----.
 Teaching experience -----. Where Trained and Year
 Area of origin (home) -----.
2. Two subjects you find easy to teach
 - a) -----.
 Why? -----

 - b) -----.
 Why? -----

Two subjects you find difficult to teach

a) -----.

Why? -----

b. -----.

Why? -----

3. List three major problems you face in teaching agriculture

i) -----
ii) -----
iii) -----

4. Do you think agriculture education in primary schools make pupils acquire agricultural knowledge and skills? Explain.

5. Do you think schooling influence students ability to apply what they have learned in school in agricultural practice at home? Explain.

6. What would you like to see changed in agriculture education at the Primary school level?

7. How effective is the teaching of agriculture in improving community agricultural productivity?

8. The government is committed to Ruralization of education in the country. Are you satisfied with the present program? Explain.

9. Other comments/suggestions

Thank you.

Appendix VI

GUIDELINES TO HELP TEACHERS ORGANIZE AND TEACH AGRICULTURE.

1) Scheming

Teachers who handle agriculture are expected to be familiar with local environmental changes in their school communities and when such changes occur. This is important so that projects may well be timed to concur with these changes. Teachers also should as much as possible see that they relate the school agricultural activities with those being carried in the community for example, weeding when the local community is weeding their crops. Teachers should also note those projects which will need a long time to be completed so that they may be started at the beginning of the year. There is also need to co-ordinate with other subjects so that related topics may be taught at about the same time.

2) School Shamba/Garden

In many instances, pupils' interest towards agriculture is killed through use of school garden as a place of punishment. The garden should be looked upon as a place of learning, a laboratory to carry out experiments, and a resource of ideas. The shamba (garden) after the initial funding should be capable of supporting itself in all subsequent operations. Any money from the produce should either be re-invested (plough-back) or saved for future needs. The shamba should have three major parts:

- a. demonstration plots for experiments
- b. Museums as places to see many crops grown locally and nationally.
- c. Pupil's plots for projects to be used for real food production and not for experiments. The projects should be on crops and animals found in the area. In addition, every school should have a 4K (Kuungana, Kufanya, Kuisaidia Kenya) club. The teacher should co-ordinate with the local agricultural officer on the running of this club. Pupils should be encouraged to have projects at home. The teacher should find time to visit, and see the progress of these projects either alone or with the class.

3) Management of Projects

It is necessary for the teacher to work with the school head to see how the projects can be funded and to devise ways of acquiring working materials e.g. tools, seeds, fertilizers, chemicals, etc. The school committee and the parent - teacher association could help much in this aspect.

4) Methodology

- (a) Class organization:

- Children should be organized in small manageable mixed ability groups.
- Children who are neighbor at home may be grouped together for ease in carrying out home projects.
- Children in boarding schools should be provided with a space for carrying out group projects within the school compound.

(b) Demonstrations:

- Demonstrations in agriculture are very useful not only for educational purpose but also to avoid accidents where pupils take things for granted.
- New skills should always be demonstrated before pupils are allowed to practice e.g. mixing agro-chemicals, spraying, milking etc.
- Each pupil should have a turn in practicing what has been demonstrated.

(c) Motivation

- The teacher should motivate the pupils so that they practice more actively in Agriculture. The following are some of the ways by which they can be motivated:
- the income from projects carried out by pupils should be seen to be of use to them e.g. in buying more seeds, animals, materials for construction, books etc.

The use of produce by teachers without pay should not be allowed.

- Children should be given responsibilities which they enjoy and through which they are able to express themselves.
- The teacher should organize for the display of the pupils produce.

(d) Visits

All visits to places of agricultural interests should be well organized. Discipline should be maintained at all times. When going out, the teacher should co-ordinate with other teachers so that other subject matter may also be acquired.

5) Resources

The teacher should be aware of as many sources as possible where he can get information and materials for use in teaching agriculture. Some of these are:

- (a) Research stations
- (b) Farmers in the area (select some few good ones)
- (c) Farmers training centers
- (d) Companies which deal with agricultural materials
- (e) Shows, agricultural field days
- (f) Co-operative societies and marketing boards etc.

(g) KIE (EMS)

(h) Journals (regular supply)

(i) Teachers Advisory Centers

(j) Agricultural extension workers.

6. Time Tabling

Weather conditions should be considered in allocating agriculture time on the Time Table e.g. in areas where rain falls most afternoon, outside class activities should be minimal after one o'clock. Agriculture lessons especially practicals should be placed before break so that the class has time to clean up. Most of agriculture lessons should be double periods.

7. Community Relations

It is useful for the school to cultivate good relationship with the community around so that help in various ways can be got easily. The school should participate in community projects. The school shamba (garden) can also be used as a good example to be used by farmers around the school.

8. Safety

(a) Projects:- It takes money and a lot of time to establish projects and it would be most dis-hearting to see them flop through neglect. For this purpose, arrangements should be made for their security.

(b) Pupils:- Safety precautions should be taken to see that pupils are not injured through use of chemicals/ handling animals etc.

(c) Before any chemicals are used by pupils in the school, the teacher should have read and understood all instruction given. These instructions must be followed.

Appendix VIIDetails of Content of Standards VI and VIII Agriculture.A) Standard VIUnit I(a) Soil Erosion

- (i) Discussing agents of soil erosion - wind, water, animals, man.
- (ii) Finding information on factors which influence soil erosion:- slopes, bareness of soil, soil type, rain intensity, human activities.
- (iii) Carrying out experiments in class on the effect of agents and factors which influence erosion.
- (iv) Visiting eroded areas at different times of the year to observe changes which have occurred.
- (v) Collecting and comparing soil samples from eroded and non-eroded sites.

Unit II(b) Farm Structure

- (i) Identification and comparison of various materials used in construction of such farm structures as: dips, silos, milking-parlours, crushes, fences etc.
- (ii) Practicing construction of some of the simple structures e.g. fences, cages for poultry, crushes, pigeon cages, rabbit cages etc. stores and cribs, pit silos, nursery seed-boxes, compost pit etc.

NB Use locally available materials

Unit III(c) Animal Breeds

- (i) Identification and naming of various livestock breeds found in the local community.
 - cattle, sheep, goats, poultry, pigs, rabbits, camels, donkeys.

UNIT IV(d) Animal Management

Practice the following husbandry practices on various animals.

- (i) Selection and breeding
- (ii) Feeding
- (iii) Housing
- (iv) Diseases and pest control
collecting, classifying, drawing and preserving the pests.
- (v) Other routine jobs to be discussed.
 - castration
 - dehorning
 - debeaking
 - docking
 - shearing
 - foot-trimming
 - tooth clipping
 - culling
 - identification - ear tagging and notching, branding, tatooing.
 Visiting farms to observe some of the routine jobs and diseases.

UNIT V

(e) Farm Labour

- (i) Identifying the various types of labor.
- (ii) Discussing on effective use of labor on the farm.

UNIT VI

(f) Farm Equipment

- (i) Observing and identifying various working equipment in the locality.
- (ii) Identifying the proper use of each equipment.
- (iii) Practice using some of the equipment.
- (iv) Maintenance and repair of these equipment. (v) construct simple farm equipment e.g mole traps, bee-hives, hand-carts etc.

UNIT VII

(g) Farm Hygiene and Safety

Find information about how to prevent health hazards.

- (i) Use of chemicals
- (ii) Carcass disposal

- (iii) Clean farm produce and products
- (iv) Drainage
- (v) Siting and location of farm buildings
- (vi) Proper storage and handling of tools and carry out some of the above practices
- (vii) Proper handling of animals.

Standard VIII

UNIT I

(a) Farm Tools and Equipment

- Discuss proper use of various farm tools and equipment
- Make handles for any of the following tools: i) panga ii) jembe/hoe iii) rake iv) spade/shovel v) axe
- Fix the handle correctly on the tool.
- Construct a simple wheelbarrow/hand-cart which is functional.
- Carry out the following maintenance practices on farm/tools/equipment
 - i) sharpening ii) oiling/greasing iii) painting iv) proper storage v) cleaning.
- Practice the proper use of the farm tools and equipment which have been constructed/repaired.
- Practice proper storage.
- Discuss where farm tools and equipment can be purchased.

UNIT II

(b) Poultry Keeping

- (i) Find information on the following:
 - sources of chicks for rearing
 - natural incubation
 - brooding/brooder management
 - feeding
 - housing
 - disease and parasite control
 - routine practices
- (ii) Marketing

- (iii) start a poultry rearing project.

UNIT III

(c) Rabbit Keeping

- (i) Find information on the following
 - selection and breeding
 - feeding
 - housing
 - health
 - slaughtering rabbits
 - marketing
- (ii) Construct rabbit hutches
- (iii) Start a rabbit keeping project.

UNIT IV

(D) Bee Keeping

- (i) Find information on the following:
 - materials for construction of bee hives
 - construction of the bee hive
 - siting of bee hives
 - harvesting and processing of honey
 - marketing of bee products
- (ii) Start a bee keeping project.

UNIT V

(e) Agricultural Resources and Services

- (i) Agricultural resources
 - discussion on basic resources for farming (labor, land, capital, management)
 - discussion on various methods of acquiring these resources.
 - discuss methods of land tenure systems.
- (ii) Agricultural Services
 - finding information about various services available to farmers and their sources e.g. extension services, training services, marketing, (internal and external) credit facilities, tractor hire service.

UNIT VI(f) Economic Factors Affecting Agricultural Production

Finding out information and effects of

- (i) levels of education
- (ii) banking services and insurance
- (iii) credit services
- (iv) access to energy resources
- (v) national economic policies
- (vi) levels of mechanization in agricultural to agricultural production
- (vii) demand and supply in relation to prices
- (viii) communication and transport services.

UNIT VIII(g) Employment Opportunities in Agriculture

- (i) Recognizing various job opportunities available in agricultural sector:
 - a) self-employed e.g. farmers
 - b) farm-employed e.g. farm workers
 - c) government, agriculture related industries and firms.
- iii) Investigating agricultural activities that are most in the community and why.