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# **The Organisation of Social Science Research in Eastern and Southern Africa, Kenya Chapter**

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We are also very grateful to the different contributors in terms of papers and reports that have added up to the chapters in this publication.

Last but not least, we are grateful to Elizabeth Makokha for reorganising the various papers into a useful manuscript.

Prof Helen Mondoh

## **DEDICATION**

### **A Tribute to John Daudi Achoka**

The two volumes in the Contemporary Developmental issues in Kenya, owe something to John Daudi Achoka, who was a very active member of OSSREA. Tragically, Achoka died before the papers were reviewed and reorganised into a manuscript. The members of the editorial board agreed that one of Achoka's papers should form a chapter in the first volume of this publication in his memory.

At the time of Achoka's death, the members of OSSREA - Kenya chapter could not all attend his burial, but I wish to make the following tribute to him on the chapter's behalf:

Achoka was a true and rare professional in all seasons. Achoka's dealings with OSSREA over the five years I knew him were imbued with four virtues: simplicity of approach, intellectual integrity, thoroughness and timeliness. I first met Achoka in 2001 at an OSSREA workshop in Nakuru, and I later worked with him closely in my capacity as an official of OSSREA Kenya chapter. He was the OSSREA campus Rep for Daystar University.

The five-year experience not only enabled Achoka to inculcate in me and others the serious business of rigorous research but also very importantly, paved way for his upward mobility in his career as a university lecturer.

Having followed Achoka's work closely, I can say he was good at multi-tasking. He was also multidisciplinary in his work. He taught Mathematics Education but also cast his eye on food security.

We at OSSREA - Kenya miss Achoka's capability, resourcefulness and tenacity in producing rigorously researched and perfectly written work. He offered his assistance and guidance without reservations; and always with a ready genuine smile.

We also miss his courteousness, his calmness, his punctuality and thorough preparedness. His eloquence in making a point and his elegant solutions to the most intransigent of problems cannot go unnoticed. He was always ready to listen to any argument even if it contrasted his own. Most of all, we miss Achoka as a friend. I know his family and inner circle of friends miss him more. I pray together with others, and we are comforted by the knowledge that we were privileged to be associated with a good man.

May J.D. Achoka rest in peace.

Prof Helen Mondoh

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## INTRODUCTION

The papers published in this volume were selected after careful review and editing from several papers presented at various National conferences of OSSREA - Kenya chapter, held between 2003 and 2005.

The conferences which had different themes had one common theme; that is development. The papers presented in this volume fall under three broad themes namely:-

1. Agriculture, Food Security and Health.
2. Culture, Education and Development
3. Environment, Land Use and Conflict Management.

Section 1 of the book contains three chapters addressing various issues under Theme 1.

Chapter 1 examines appropriate issues that affect household food security and nutrition. The chapter further outlines the issues that impinge on the food situation with reference to some African countries.

Chapter 2 underscores the importance of urban agriculture in providing livelihood opportunities and solving socio-economic problems. The chapter highlights the need to encourage the sustenance of urban agriculture as a livelihood and food security buffer for urban dwellers especially in developing countries.

Chapter 3 provides an analysis of a combination of factors that influence reproductive health of women. The chapter argues that there is interplay between culture and the socio-economic status of women which, hinders them from achieving full health in their reproductive processes.

Section 2 of the book addresses issues under Theme 2. The section consists of eight chapters raising various issues on culture, education and development.

Section 3 addresses issues under Theme 3 and consists of three chapters; 12, 13 and 14.

The first chapter in this section recommends multifaceted strategies of psychosocial healing and empowerment of the Nuer community on sustainable modes of supporting their livelihood

The second chapter under this section focuses on vulnerability of urban wetlands, which are slowly being phased out to give room for industrial developments and urban expansion.



The last chapter is a reflection on the land tenure system in Kenya, and how the effects of the tenure system have hindered Kenya's efforts towards poverty reduction

**SECTION 1:**  
**AGRICULTURE, FOOD SECURITY AND HEALTH**

## CHAPTER 1

# ISSUES IN FOOD SECURITY AS INDICATED BY AVAILABILITY, ACCESS AND UTILISATION AT THE HOUSEHOLD LEVEL

*John D. Achoka*

### **Abstract**

Although household food security may not capture all dimensions of food such as availability, access and utilisation; inability of households to put enough and quality food on the table is a manifestation of bad food security policies in place. Food security reflects the state of productive health and is an important indication of the household level of poverty. This paper examines appropriate issues that affect household food security and nutrition. The purpose is to identify the nature of food insecurity, assess the severity of the situation, monitor changes over time, and assess the impact of interventions. The risks that can disrupt food availability, food access and utilisation such as HIV/AIDS, urbanisation, food aid assurance and social-cultural variables are examined. The paper further outlines the issues that impinge on the food situation with reference to some of the African countries. The purpose is to sensitise food policy makers about value of assessment of the effectiveness of local and national measures put in place to address household food security vis-a-vis national status.

### **Introduction**

Food security is a concept that evolved during the 1990s. Its emphasis is far beyond a traditional focus on the supply of food at the national level (USAID, 1995). USAID (2002) emphasised three key elements of food security: food availability, access and food utilisation. However, a fourth concept that is increasingly becoming accepted is the risk that can disrupt any one of the first three factors.

Availability, access and utilisation are hierarchical in nature. Food availability is necessary but not sufficient for access, and access is necessary but not sufficient for utilisation. There is a feedback loop in that, adequate and appropriate utilisation of food is an input to achieving adequate access for all (via health, sound nutrition and other human capital effects). While access to food is required for sustainable food availability, where chronic undernourishment impairs labour productivity and encourages resource depletion, risk represents a cross-cutting issue that affects all components of the food security framework. Hence, food security is achieved when all people at all times have both physical and economic

access to sufficient food to meet their dietary need for a productive and healthy life (USAID 1992).

In 1979, the World Food Programme Report conceptualised food security equating it with an assurance of supplies and a balanced supply-demand situation of staple foods in the international market. The concept of food security has more meaning if understood in line with the legal commitments of the United Nations Universal Declaration of Human Rights of 1948. The declaration accepts the "right to adequate standards of living," including food. The Universal Declaration on the Eradication of Hunger and Malnutrition (1974), declares that "every man, woman and child has an inalienable right to be free from hunger and malnutrition." Each of these tenets (as quoted by Maxwell and Frankenberg 1992) suggests implicitly or explicitly mandatory distribution of world food to the needy.

The World Bank defined it as the "access by all people at all times to enough food for an active and healthy life." This definition deals with production in relation to food availability; it addresses distribution in that all should access the produce. It covers consumption in the sense that individual food needs are met in order for that individual to be active and healthy. Thus, food security exists when all people at all times have physical and economic access to sufficient, safe and nutritious food for a healthy and active life.

A good food security policy therefore, must ensure that all people have physical and economic access to the basic food they need in order to work and function normally. Food security differs fundamentally from food production. It can be constrained by availability of food - inadequate supplies of food, including imports and food aid; by physical and economic access, and utilisation of food. However, they deal with the most basic need of life, and that is food.

### **Food Availability**

Food availability entails sufficient quantities of appropriate, necessary types of food from domestic production, commercial imports or donations that are consistently available to the individuals or, are within reasonable proximity to them or are within their reach. Food availability, when considered at the national level, as affected chiefly by the national economic context, is itself a function both of international economic flows and of domestic macro-economic and food policy decisions, including imports and food aid. Food, availability, when considered at the sub-national level (regional or local), depends on the existence and conditions of internal food markets, themselves a function of (among other things) food supplies at the regional level. Therefore, food availability at the national level does not provide food entitlement to households and individuals. Food security is not about how much food national governments have in store but the variety of foods that individuals of each family can afford. Essentially, food security is a broad concept dealing with production, distribution and consumption vis-à-vis food entitlement for all household members.

## **Food Access**

Food access is possible when individuals have adequate incomes or other resources to purchase or barter. This is to obtain levels of appropriate food needed to maintain consumption of an adequate diet/ nutrition. It is assumed that whatever food is produced in the country, will be evenly distributed to each region and to each household. Alternatively, those who fail to produce will have access to the food surplus in the country (through the markets) if and only if, they have purchasing power. Food access is influenced by household production, which calls into question issues related to agricultural technology, land distribution, education, access to capital markets and the availability of inputs; and by household income, which depends on the general micro-economy namely:- labour markets, supply and demand, product markets.

## **Food Utilisation**

Food utilisation is premised on many factors. These include appropriate food intake, physical health of individuals, knowledge of caretakers, access to safe water, cultural beliefs with respect to food, prevention of epidemics, reproductive health and family planning.

Food utilisation has four demands on the individuals and the food policy maker. These are that: food is properly used, proper food processing storage techniques are employed, adequate knowledge of nutrition and childcare techniques exist and are applied, and adequate health and sanitation services exist. Moreover, food utilisation is the proper biological use of food, requiring a diet providing sufficient energy and essential nutrients and portable water. It must be reiterated that effective food utilisation depends largely on knowledge within the household of food storage and processing techniques, and on basic principles of nutrition, childcare and illness management.

The Food utilisation component of food security is the most rarely addressed dietary/ nutritional practice of families. This creates food wastage and artificial food shortages due to taboos and selective eating of food. Food security at the household level can be defined as "access to adequate food by households over time" (Eide, quoted in Maxwell and Frankenberger 1992).

Food insecurity in Africa and in Kenya specifically, has persisted and many families face this problem. For a long time, famine, drought, and natural calamities associated with them have been blamed for the food insecurity in Kenya and many African countries. Although it is difficult to separate ecological, economic, social and political conditions of a country from food insecurity, the key factor in this matter is absence of a sound food security policy.

## **Kenyan Food Policy**

Agriculture in Kenya accounts for about a third of gross domestic product. Of the Kenyan population, 76% lives in rural areas, and agriculture employs 85% of the rural labour force. Rural labour force has been growing at 3.5% annually, while agriculture has been growing at 2.6% annually (World Bank 1986; GOK 1993). Of Kenya's merchandise exports 70% are agricultural, and 33% of manufacturing sector output is based on agricultural products (Pearson 1995). Because of agriculture's contribution to total output and employment, for sometime to come, attempts to improve living standards must give particular attention to increased incomes and productivity in the agricultural sector. Enhancement of agricultural productivity is thus an important condition in alleviating rural poverty and increasing household food security and stimulating growth in non-farm activities.

Unfortunately, 46 years after independence, Kenya does not have a comprehensive food security policy and consequently food insufficiency. The situation is made worse by the prominence that Kenyan farmers have attached to growing cash crop, including horticulture and floriculture.

Enhancement of production of food crops such as cassava, sweet potatoes, maize, sorghum, millet, wheat and beans, can improve food availability both at family level for the rural people and in the market for the urban people. The keeping of poultry, goats, rabbits and cows completes household food security in terms of food utilisation.

Achieving and sustaining food and nutrition/ dietary, security should be at the forefront of government and household food production. Currently food production potential, can be equated to agricultural land available minus the land under cash crop and yield related factors such as inputs, weather and food processing measures.

The future of food security in Kenya, must address the fact that high potential agricultural land is only 13%, the medium potential agricultural land constitutes a mere 6%, while the low potential agricultural land is 81% of the total agricultural land . The government must therefore, ensure the input of new technologies into improved product management practices like pest and disease control if the 19% high and medium potential agricultural land has to provide food for Kenyans. It must also ensure that the technologies are relevant to actual production conditions at household level and immediate nutrition/dietary needs of the household members.

The occasional deaths in Rift Valley, Eastern and North Eastern provinces as a result of famine is an indication of lack of access to food. These deaths are not exclusively due to starvation but they are also related to diseases caused by malnutrition. In this context, devising an appropriate measure of household food access is useful. This measure will enable the food security policy makers to:-

1. identify the food insecurity of households;
2. assess the severity of their food shortfall;
3. characterise the nature of their food insecurity;
4. monitor changes over time; and
5. assess the impact of interventions (FANTA 2002).

### **Assessing Household Food Access**

Obtaining data on household food access, however, can be time consuming, expensive and requires a high level of technical skill both in data collection and analysis. Nutrition surveillance of children through clinics, for example, could be analysed at the clinic level and at the district, regional and national levels. People can soon learn of their sensitivity to food shortages (or ill health - malaria, for instance, can give rise to increased levels of under nutrition among children, but it is not difficult to eliminate it as a cause). Districts can argue for increased levels of support within regional or national structures. Better still, if nutrition statistics - so innocuous but so telling, can be reported regularly to local village committees, or district development forums, or any other public or semi-public arena, they soon become public property and a means to pressurise the system.

The best way to measure food security at household level is through obtaining data about dietary diversities of various members of the community. This is attractive as a food security indicator for the following reasons: one, a more varied diet is a valid outcome in its own right. Two, a more varied diet is associated with positive outcomes such as improved birth weight, child anthropometric status, haemoglobin concentration and reduced risk of mortality from cardiovascular diseases and cancer. Three, issues on dietary diversity can be asked at the household or individual level therefore, making it possible to examine food security at household and intra-household levels.

A study conducted by Food and Nutrition Technical Assistance Project (FANTA) in ten countries:- Bangladesh, Egypt, Ghana, India, Kenya, Malawi, Mali, Mexico, Mozambique and the Philippines, is presented below:

In this study data covering regions of the study countries was first obtained. Secondly, the data were obtained from rural and urban areas, poor and middle-income countries and during different seasons of the year. This was a representative study of the food security in the entire country studied taking into account all aspects that impact on the food security of people individually and in the country as a whole.

The results of the study are presented in Tables 2 and 3. The analysis of the data on dietary diversity, used regression analysis techniques to determine the relationship between dietary diversity to household per capita consumption and caloric availability in the food consumed. These findings are presented in this paper, as an example to show how national food security policy makers would use

data to come up with comprehensive food policy papers that would cover all aspects concerning availability, access and utilisation of food in the country.

Table 2: Range of the mean of Dietary Variables

Variable	Range of the mean for 10 Data Sets
Dietary Diversity (# of individual foods)	8 - 48
Household per capita consumption (PPP dollars)	8 - 56
Household per capita caloric availability	1539 - 3746
Household per capita caloric availability from staples	1002 - 2656
Household per capita caloric availability from non-staples	283 - 1776

From Table 2, the following observations can be made:

1. A change in dietary diversity was positively associated with change in household per capita consumption and household per capita caloric availability.
2. Changes in dietary diversity were also associated with changes in the household per capita availability of calories from staples and non-staples, with the magnitude of this association being higher in non-staples.
3. These associations were observed in both rural and urban locations and across seasons.
4. The associations were strong whether dietary diversity is measured as the number of individual foods (e.g. rice, maize, bananas, and sugar) or the number of food groups (e.g. basic staple grains, legumes, dairy) consumed.

Table 3: Percent Change in Key Variables given a 1% Change in Dietary Diversity

Variable	Mean	Range
Household per capita consumption	1.00	0.65-1.11
Household per capita caloric availability	0.7	0.37-0.73
Household per capita caloric availability from staples	0.5	0.31-0.76
Household per capita availability from non-staples	1.4	1.17-1.57

Results in Table 3 show that dietary diversity is a good proxy indicator of household per capita consumption and household per capita caloric availability. These are measures of the access component of household food security. Dietary diversity can therefore be used to identify:-

1. The food insecurity.
2. Monitor changes over time.
3. Assess the impact of interventions on household food access.



## **The Risks that can Disrupt Food Availability, Food Access and Food Utilisation**

In the context of the evolving debate on food aid programming priorities, there are three new issues that need to be squarely confronted: HIV/AIDS, rapid urbanisation, uncertainty over the future stock and stability of food aid supply for development.

### ***HIV/AIDS***

HIV/AIDS has emerged as a scourge that in scale, complexity and tragedy, threatens to be as devastating in the 21<sup>st</sup> century as famine was in the 19<sup>th</sup> and 20<sup>th</sup> centuries. With approximately 42 million individuals currently living with HIV/AIDS, the annual death toll exceeds three million and continues to rise (UNAIDS/WHO 2002). Assuming that each infection bears directly on the lives and livelihoods of just four additional people, there are already almost 200 million people worldwide affected by the disease - most of them in low-income developing countries.

Sub-Saharan Africa is the region most affected by HIV/AIDS, and where the disease has become not only the leading cause of adult morbidity and mortality but also a major contributor to recent large-scale food crises (Barnett and Rugalema 2001).

This pandemic is unusual in a variety of ways:-

1. It mainly infects and kills individuals in the most productive group of between 15 to 45 years.
2. The disease affects household food security through multiple routes. Immune system resistance to infection may be higher among well-nourished people. Infection and death, however, contribute to eroding a household's capacity to attain food security and/or withstand shocks. AIDS morbidity and mortality reduce household's ability to produce and buy food by depleting savings and assets, for medical treatment but especially for funerals (EgalandValstar 1999). Morbidity affects agricultural productivity by reducing labour availability and efficiency, pushing households to reallocate labour from productive activity towards patient care and by shifting income-earning responsibilities to the elderly and the young (Brown and Itaddad 1994; Deininger, Garcie and Subbarai 2001).

### ***Urbanisation***

The second emerging issue is the increasingly urban nature of food insecurity. Concerns do not relate to cities per se but to the functional processes and outcomes associated with a) rapid growth, b) vulnerability to shocks of large concentrations of people, and c) the nutrition transition.

Food access in urban areas is chiefly determined by food prices and by household income. The purchasing power of the minimum wage has evolved in different directions over the last two decades, depending on the commodities examined.

### ***Urban Shocks***

A second concern of urban population concentration relates to shocks, while (IFAD, 2001) argues that, the rural poor are "much more vulnerable to fluctuations in well-being than the urban poor," the urban poor are always severely impacted by financial crises because of more rapid price dissemination effects and real food supply constraints (Frankenberg *et al.*, 2002). Large cities in poor countries located near seas are often affected by natural disasters: as such windstorms (for example, Mitch and Orissa), earthquakes (Budj, Gujarat, Mexico City, Mexico), floods (Dhaka, Bangladesh) and even drought (Bulawayo, Zimbabwe) (IFRCRCS 2001; Webb 2003). The cost of disaster-proofing large urban areas and feeding the frequently displaced is prohibitive.

### ***Epidemiologic Transition***

This transition describes fundamental shifts in diet, physical activity, health, and nutrition associated with the industrialisation, wealth accumulation and global market integration that are often linked to urbanisation. Concerns relate to negative consequences, such as altered dietary patterns and decreased physical activities. Here, the problem lies in food utilisation, which tends to go hand-in-hand with an increase in chronic diet-related diseases. Most urban households, for example, tend on average to consume a higher share of energy from fats and sweeteners than rural households. Moreover, most urban dwellers eat more animal products than their rural counterparts (Popkin, Horton and Kim 2001).

### **Ensuring Future Food Aid Resources**

The overall trend in food aid availability has been downward since the mid-1980s and that decline has occurred in the context of significant and continuing volatility in international supplies (Sposato 2002; WFP 2002).

### **Conclusion**

Food Security Policy should ensure that:-

1. increase in Agricultural productivity increases contributes powerfully to food security by augmenting the quantity of food available in the country and by providing greater food access to rural households; either because it enables production of more food, or because it provides them with higher incomes from the sale of their products;

2. food availability is pursued at the national level by supporting food policy analysis, particularly in the areas of domestic food production, food imports and national food balance sheet;
3. in regions where food markets can be supplied on a year-round basis, food availability should be pursued by supporting a diversification strategy that stimulates regional market exchanges, and supports division of labour based on regional comparative advantages and forments overall economic growth;
4. food availability is achieved when sufficient quantities of food are consistently available to all individuals within a country. Such food can be supplied through domestic output, commercial imports, existing stocks or food assistance; and
5. food access is ensured when households and all individuals within them have adequate resources to obtain appropriate foods for a nutritious diet.

### **Recommendation**

Food security is an important factor in a country's development agenda. There is need therefore for each country to develop a food policy.

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## **URBAN AGRICULTURE AS A SIGNIFICANT SOURCE OF LIVELIHOODS AND FOOD SECURITY**

*Violet K. Mugalavai, Harry Ododa and Grephas Opata*

### **Abstract**

In every region of the world, landscapes are being transformed into food producing and marketing areas. Rural people are migrating to urban centres in search of economic and social opportunities, while city dwellers are becoming more interested in producing their own food. In the midst of global significant levels of hunger amidst plenty, urban and peri-urban agriculture is fast contributing to the availability of food in cities and therefore helping to improve the diet of urban consumers. It is estimated that the number of people obtaining part of the food from urban agriculture in Eastern and Southern African countries will rise from 25 million to 40 million by the year 2020 (UNDP 2003). Currently, urban agriculture and the informal sector are not legally planned for, within the urban plans in most developing countries due to the historical nature of the urban planning system. However, the nature and type of urban developments around the world has allowed the development of urban agriculture and its supporting systems. Therefore, the importance of urban agriculture in providing livelihood opportunities and solving socio-economic problems should not be ignored by urban planners and local authorities. This paper seeks to highlight the need to encourage the sustenance of urban agriculture as a livelihood and food security buffer for urban dwellers, especially the urban poor in developing countries.

### **Introduction**

Urban Agriculture is an industry located within (intra-urban) or on the range (peri-urban) of a town, a city, or a metropolis, which grows, raises, processes and distributes a diversity of food and non-food products; by (re-) using largely human and material resources, products and services found in and around that urban area, and in turn supplying human and material resources, products and services largely to that area (Mougeot 2000; Smith et al 1996). The production, processing and marketing systems of urban agriculture involve food and non-food products from horticulture (fruits, vegetables, and flowers), micro-livestock, poultry, aquaculture, cereals (maize, wheat, rice), and legumes such as groundnuts and beans.

According to Mougeot (2000), agriculture will be more or less urban, according to the extent to which it will use the urban eco-system and in turn be used by the same

urban eco-system. Smith *et al.*, (1996) also suggests that a world in which food systems and settlement systems are more integrated will enable a country to intensify the production and availability of food to the population. Urban agriculture can therefore, be recognised as a basic industry that invigorates growth in forward and backward links, such as providing for the food industry and thus increasing efficiency, productivity and employment. As an urban economic activity, agriculture has attractive attributes such as creating jobs at a low capital investment and supplying the produce to markets within the urban informal and also formalised sector.

In urban agriculture, production and marketing are partners and their inter-relations are inevitable. The complementary interactions of production, processing and selling systems may deliver products and services that use urban assets and resources within the urban agriculture context, thus making the city more eco-balanced and resourceful. Furthermore, urban life can be diversified so as to be an effective arena for the success of small and micro-enterprises. The food system of producers, suppliers, distributors and consumers if kept within a short distance of local relationships through urban and peri-urban productions can enhance a multiplicity of economic and social interactions.

Definitions of urban activities, have most of the time excluded agricultural land use and agricultural activities by African planners. Despite the fact that pre-colonial administrators accommodated urban land use for agriculture in their plans, African planners in cities of today, have ignored this fact and thus do not meet the needs of the dynamic society (Boateng 2002). Social development in the city cannot escape to recognise differences, which should be factored in alongside understanding of the socio-economic wellbeing of the urbanites in policy analysis and decision making.

Urban agriculture, has a major stake in enabling families that have no access to open space for growing some vegetables and fruits for home consumption, to be provided with a platform of buying from the farmers for either consumption or sell, and performing survival livelihood activities which include informal sale of labour, home gardening and food processing, livestock production, cultivation, use of natural or common property resources, labour exchange among family or neighbours, contracted work, scavenging, stealing, hawking, and vending. These may be practised off-farm, involving both physically fit and vulnerable members of the society such as the elderly and children, from both poor and good economic backgrounds; thus creating a ripple of double livelihood opportunities. Urban agriculture not only provides food production and self employment but also helps to create an improved micro climate and conserves soils. It further helps to minimise waste in cities and to improve nutrient recycle, and to improve water management, biodiversity, oxygen-carbon dioxide balance, and the environmental awareness of city inhabitants.

## Urban Agriculture in Perspective

The rapid urbanisation of the developing world is considered by many to be the key demographic feature of the late 20<sup>th</sup> century and early 21<sup>st</sup> century. Projections suggest that the developing world's urban population will increase by another 70% to reach 3.4 billion in 2000 (UNDP 1996). If in 1988 at least 25% of the developing world's absolute poor were living in urban areas, by the year 2000, these were expected to comprise 56% of the world's poor households (UNDP 1996). With the exceptions of Latin America, the developing world is still very much a rural world, and about 90% of these rural poor live in Asia, (primarily South Asia), and Sub-Saharan Africa (UNDP 2003). The number of people living in urban centres also continues to grow at approximately twice the rate of rural areas. It is expected that the city population world-wide will increase from 2.76 billion in 1995 to 5.34 billion in the year 2025, thus exerting greater pressure on the natural environment than ever before (UNDP 1996).

Urban agriculture is currently a growing global phenomenon practised by an estimated 800 million people who produce 10% of the world's food supply (UNDP 1996; Smith *et al.* 1996). Over the decades, there have been dramatic shifts towards urban agriculture in Sub-Saharan Africa with increased volumes of production, using both appropriate and advanced technologies.

In the developing world, poverty and hunger have long been regarded as a major problem and the number of urban dwellers was expected to double by 2005, thus reaching more than 5 billion, with 90% of the people living in the south (UNFPA 2000). The major factors that precipitated this forecasts included environmental stress, declining agricultural yields, structural adjustment and trade liberalisation wars, and natural disasters (Mougeot 2000; IDRC 1997).

In Africa, nearly 60% of all urban farmers do not own the land on which they farm, and more than 40% use public land (Obudho 1991). It is also estimated that nearly 25 out of the 65 million people living in urban areas of Eastern Africa obtain part of their food from urban agriculture and that by 2020 at least 35-40 million urban residents will be dependent on own production for nutritional survival. According to Smith *et al.*, (1996), about 25-30 million kilograms of crops worth US\$4 million were produced in the country's urban areas in one single season.

Agriculture depends upon cities as markets and sources of technological inputs, and modern agriculture would be impossible without implements, techniques, roads and markets that are made available to it by the growth of cities. However, most of the developing countries in Sub-Saharan Africa are not well endowed in terms of resources, institutions and technology and will always need to import food, unless new innovation and technology enable them to mobilise their resources and to achieve food security in the long run. Urban agriculture can reduce the dependency of countries of the South on imports and it should be given a larger role in feeding the urban population. Income generation and employment

can also be increased in food deficient countries in the Sub-Saharan Africa region if the countries re-orient their development strategies toward increased investment in their agricultural sectors so as to alleviate food insecurity at national, local and household levels.

**Urban** food production is in many cases a response to inadequate, unreliable, and irregular access to food supplies due to either **lack** of availability or purchasing **power** and inadequate access to formal employment opportunities, due to deteriorating national economies in developing countries. This situation has been **hastened** by the Structural Adjustment Programmes (SAPS) which have significantly contributed to the market **pressures** (Saad 1996) and thus affected **local** livelihood conditions and responses.

**The** small quantities of food produced through urban agriculture cannot be seen as competing with rural agriculture but complementing it. Moreover, there is a break between rural production and urban consumption that is marked by the need to supply more expensive European-type market products such as green beans, green pepper, tomatoes, ginger, garlic, egg-plants, among others. Urban agriculture is actually known to thrive better with better prices on offer for the more common produce such as kale, tomatoes and spinach during periods of harsh climatic conditions because most of the urban agriculture entrepreneurs use farming technologies that are more advanced than the rural farmers.

Since the late 1970s urban agriculture has been expanding in a growing number of developing countries that are experiencing rapid urbanisation and unable to supply sufficient, affordable food to large sectors of their urban population. Urban agriculture has also grown in highly urbanised societies, such as the U.S.A., Japan, **Western** Europe, and also in Asian city states and Pacific Islands such as Fiji (**Mougeot 2000**).

As towns **and** cities in Kenya grow larger, **they** are contributing a greater share toward their food demand, and thus a larger percentage of their citizens are becoming active in food production, and in some countries it is reported that urban **food** production is growing more rapidly than **the** population. Those involved in urban agriculture include suppliers of resources inputs and services and the producers, transporters, processors, retailers, consumers, promoters, and managers. However, urban agriculture has been overlooked, underestimated and underreported. Boateng (2002) associated urban agriculture in African cities to a transitory activity or an activity characterised by "impermanence syndrome" both in time, space and type of activity, which may therefore affect a chain of stakeholders variably.

The importance and diversity of urban agriculture systems in any given city depends on multiple factors at different levels ranging from global trade to national and regional development, physical planning, social strata and income levels to household and education variations. Studies on urban farming in Sub-Saharan



African cities have been conducted in Eastern, Southern, Central and West **African** countries (Boateng 2002). In Kenya, urban farming is practised by all categories of the social classes but the largest group comes from the low-income earners. **Many** of them practise urban agriculture on waysides and along riverbanks. **Plot sizes** may not differ very much between the income categories. It is the inputs **and** outputs that make a difference within the high income households realising **better** harvests than the low income households due to the use of better seeds, primer land, better or trained labour, use of improved technology, and better security.

Generally, the low-income households rely on urban cultivation as a survival strategy, whereas for the high-income households, it may be an entrepreneurial or leisurely venture. The poor are most of the time the "hand labour" on the urban farms in return for a wage, salary, temporary housing and/or food. However, many of them lack the knowledge and skills required for crop production, although they are known to have some "indigenous knowledge that works". Most of the urban poor live by selling their labour to employers within the urban agriculture farms. This is prevalent among poor households and it involves women, men and children who are engaged in production and selling activities in horticulture, animal husbandry, fishery, forestry, and a variety of other agricultural activities carried out in formal or non-formal settings, and they may contribute positively to waste management and neighbourhood beautification (Remenyi 2000) or negatively to natural resource depletion and degradation.

### **Urbanisation and Food Security**

The global number of hungry people keeps rising and in Sub-Saharan Africa, it is estimated to be one in three, totalling to 183 million (UNDP 2003). Therefore, rapid growth of the urban population has prompted concern about food security as far as availability and accessibility is concerned (FAO 1999). Rapid urbanisation in sub-Saharan Africa has resulted in urban poverty, which is recorded to be severe enough to put livelihoods and food security at risk. Apart from this, urban growth has also brought forth other problems such as unemployment and environmental degradation, which are some of the factors that also enhance food insecurity. These situations have contributed to malnutrition which has recently become an urban phenomenon with the urban poor carrying the majority of the starving urbanites (UNDP 2003). At the World Food Summit (WFS 1996), the global community agreed to reduce this number by half in the year 2015 (UNDP 2003).

Urban Agriculture is re-surgingly strongly in sub-Saharan Africa, where the fastest urban growth will occur in countries least equipped to feed their cities (Smith *et al.*, 1996). On the urban food demand side, devalued currencies, weakened purchasing power, frozen wages, retrenched public servants from formal employment, and removed subsidies on food and other basic needs have curtailed the capacity of both the urban poor and middle class to purchase the kind of food they need or the food that is needed for a balanced diet, thus escalating nutritional disorders.

Food security as a concept emerged at the United Nations Food and Agricultural Organisation World Food conference in 1974. It is centered on two sub-concepts: food availability and food entitlement, whereby food availability refers to the supply of food available at local, national or international levels. Food entitlement refers to the capability of individuals and households to obtain food. It suggests that people do not starve because of an insufficient supply of food but because they have insufficient resources, including monetary resources to acquire it (Saad 1999). Food availability does not guarantee nutritional quality that leads to a balanced diet. An individual's body also has to be in the right health status, free from diseases and living in good sanitary conditions (Saad 1999) so as to benefit by adapting itself by utilising the available food. Thus a household is food secure when it has access to the food needed for a healthy life for its entire members (adequate in terms of quality, quantity, supply, and cultural acceptability) and when it is not at undue risk of losing such access.

Food insecurity refers to lack of access to enough food. Chronic food insecurity affects the resource and may result from inadequate diet caused by the inability to acquire food due to lack of resources for buying food or producing some (FAO 1999). Transitory food insecurity results from natural calamities, which include wars, floods, climatic failures, and loss of purchasing power by groups of households and market failure due to high inflation rates and grain hoarding. All these factors are causes of famine to vulnerable groups of people especially small-scale farmers, the landless agricultural workers, the job losers, female-headed households, children and the elderly.

Food security in recent years has been seen as one dimension of the broader concept of livelihood security. Sustainable food security refers to the maintenance or enhancement of food resource productivity on a long-term basis (Saad 1999). Hunger and malnutrition in the world are increasing not only due to growing population and loss of yield but also caused by the destruction of natural plant resources, the loss of food diversity and structural changes in the environment, structural adjustment policies and governance. Urban agriculture is prone to vulnerability to the trends, shocks and the seasonality it is exposed to. Trends in population, resources, and economic indicators such as taxes, governance and the availability and use of technology will impact greatly on the input and output of urban agriculture. Shocks from changes in human and financial capital, and from seasonality which affect production prices, employment opportunities, resources availability or health may also affect the input and output of urban agriculture (IDRC 2007).

With high urban population, problems related to food security and proper employment and infrastructure are also likely to increase. At present, 840 million people are going hungry; about 2 billion people worldwide today are already afflicted with micro-nutrient deficiencies, mostly women and children (FAO/WHO 1992).

Energy foods or carbohydrates are more readily and cheaply available than other important nutrient-providing foods such as fruits and vegetables which provide vital amines and trace elements that are important for the proper functioning of the body. Animal products that provide proteins for growth and body-building are also found lacking in many household diets including urban households. Urban agriculture, if taken seriously may help to reduce these deficiencies by a desirable margin.

Within the context of urban agriculture, the chain of actors may experience insecurity when the resources required are either deplete, transitory, or non-renewable especially during harsh climatic times, when there are market failures, and also when the inputs used do not bear profit. Whether the food is available to the households is also an issue of consideration. This situation foils at different positions along a continuum for different individuals, households, communities or nations ranging from suffering quantitative compromises or absolute deprivation of food.

Past management strategies of household food security have often failed because they were based on the "macro-level" (government, administrations, and ministries). New strategies should focus on the "micro-level" such as the individual and household (Kampmann 1992). Hunger and malnutrition in the world are increasingly not only due to growing population and loss of yield but also caused by destruction of natural plant resources, the loss of food diversity and structural changes in the environment, structural adjustment policies and governance. Most of Africa's urban population spends 80% on their earnings on food only, as compared to the United States, who spend an insignificant 2% only. Food per se is not everything a human being needs in life as other social amenities such as shelter, clothing, transport, education and healthcare are necessary for worthy living.

### **Urban Agriculture and the Informal Food Sector**

For a long time, the agriculture sector has been the main employer for Kenyans, especially in rural areas but it has recently experienced slow growth and decline. This has created the movement of people to urban areas with some resorting to using open urban spaces and land to grow some crops so as to provide for their families. The avenue for income generating opportunities especially for the vulnerable resource poor to earn an income from various micro-activities in urban cities is essentially created through urban agriculture. This is because urban agriculture as an informal sector activity is a cheap and easy industry to enter as it can be started on a small scale with little investment, skill and space, and its multiplicity of activities enables multiple sustainability of employment.

As an industry, urban agriculture is closely linked to several urban, ecological, and social land economic systems. It provides economic benefits for urban farmers and

their communities and cities. The informal sector is most of the time hindered from growth due to the provision of commercial activities at a very low level of economic utility which is seen to be counter-productive for national development (Cecilia 2000). The informal sector is often unregulated or semi-regulated and the firms often violate labour relation laws or safety, health and environmental regulations. The small size of informal sector firms allows them to escape regulatory enforcement and thus reduce their operating costs. However, their capital is subject to much greater risks, and is thus optimised when they substitute labour for capital and remain small enough to capture economies of flexibility (Cecilia 2000).

Urban agriculture generates income and employment through a network of interdependent activities connected to it, especially in the informal food sector, the service sector (e.g., transportation of fertilisers, supply of seedlings and seeds, repairs, installations of tanks and water pipes) as well as the marketing sectors. Dennerv (1995) carried out a study on Kibera slums in Kenya and found out that none of the households in the study relied solely on food production for their livelihoods. Informal activities were carried out in order to obtain money quickly and these included tasks such as selling foodstuffs especially during times of high and low food supplies.

With respect to food, the informal sector includes aspects such as actual planting, harvesting, processing, packaging, distribution and selling of the commodities to the consumers in a shared responsibility network although some entrepreneurs may be able to command the whole food chain system and therefore cut down on middle costs.

The informal urban agriculture sector provides the economy with a buffer during crisis periods as it absorbs labour force displaced from the formal sector. As more men and women are displaced from the formal sector, employment in the informal sector has also increased, requiring coping mechanisms in times of crises. Market efficiencies can enable urban food security to improve by enabling the informal food sector to act as a buffer to those who have no land to practise urban agriculture within the city (Mosha 1991)

Urban agriculture has always included a vibrant agribusiness sub-sector, which continues to expand. Within this urban agriculture new phenomenon, a very large number of mid and lower income people have entered the sector for both self-consumption and entrepreneurship.

## **Urban Agriculture and Food Security in a Sustainable Development Context**

(FAO 1995) defines sustainable development as "the management and conservation of the natural resource base, and the orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present and future generations".

There is a rising phenomenon of urbanisation, and increase of the urban poor; and the continued production of an adequate food supply is directly dependent on the availability of ample quantities of fertile land, fresh water, energy and natural biodiversity. As the human population grows, the requirements for all these resources escalate and their per capita supply declines significantly as they must be divided among more and more people. The nutritional content of food as well as the quality of the food consumed is an important factor in human development as is the amount of food available.

Sustainability of agricultural systems depends on careful balance of ecological, financial and social capitals (Kroma and Flora 2001). For most of the urban agriculture farmers, the choice of urban agricultural practices may be directly linked to their searches for alternative management systems that can be financially viable, particularly due to the fact that their conventional systems are vulnerable to market forces and politically driven economic and policy changes. Such sustainable development, especially if used in the agricultural sector, conserves and improves the availability of human, natural, social, cultural, financial and political power and capital; and avails resources for use equitably in a socially acceptable manner.

The low-income food deficit countries need to work on improving their food security through rapid increase in food production, and by reducing year-to-year variability in food production. This should be done on an economically, socially, technologically, and environmentally sustainable basis, so as to improve people's access to food in line with the 1996 World Food Summit plan of action.

In urban areas where economies are often more monetised and where there is almost exclusive dependence on cash income, livelihoods crucially depend on access to employment or income earning opportunities (Beal 1999) and also capital assets (Rakodi 1999). Those with tangible assets such as land, livestock and housing are more likely to survive and prosper than those without. The major population at stake is the poor, particularly when considered at the household level, and it is therefore important to figure out how urban households feed themselves under constrained and difficult conditions (IDRC 1997).

Within the urban areas there is prominence of hunger, malnutrition and other ailments associated with poverty, and the situation seems to be worsening as urbanisation proceeds apace (UNICEF 1998). It is noted in several studies that survival is a serious issue in the African context of poverty, and migration is one coping mechanism recognised as important.

Urban agriculture provides a means of self-help for the poor and is a stepping-stone for urban environment management, and a productive, as well as aesthetic use of open or marginal urban land. Micro-farming in the cities contributes to household food security in towns directly by providing food, and indirectly by generating income. Urban agriculture offers towns and cities the benefits of income generation, hunger reduction, nutrition improvement, environment enhancement and sustainable management. In some cases, small home gardens help to decrease vulnerability by buffering risks of food shortages and by diversifying the household's sources of livelihood.

Urban agriculture provides genetic resources as well as seeds and cuttings for the production of staple foods such as sweet potatoes, cassava, rhubarb among others. They also provide ecological niches for insects, which would have disappeared otherwise. They function as preservation areas for beneficial organisms (Drescher 1997), which enable bio-control of pests and diseases. It contributes to better public health if practised properly and furthers social participation in the community where collective communal action is encouraged. It can play an important role in reducing some types of hazards and in aiding the survival of others (Smith *et al.*, 1996). The disadvantageous hazards of urban farming may emanate from general environmental pollution and poor farming practices. Poor use of pesticides, use of contaminated wastewater, air pollution, uncleared bushes and bad practices in refuse disposal; and bad food storage methods are some of the limiting factors observed. The marketing, handling and distribution system may also contribute towards contamination.

Whereas the growth rate of the population is increasing, the production is decreasing because of the degradation of the natural resources and the environment. In 1987, the World Commission on Environment and Development defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs".

Urban agriculture farmers are able to achieve social sustainability in terms of quality of life and personal empowerment or autonomy in decision-making. Their social sustainability emerges from their motivation to continue participating in urban agricultural practices despite the barriers encountered, whereas their quality of life relates to personal, family and life goals which enhance their use of human resources such as the use of time, and the relationship between members of the family or the community of the urban farmers who produce, process, and sell urban farm produce. Sustainable agriculture practices should encourage a search for

knowledge and ideas that enhance financial sustainability, while sustaining the quality of our environmental capitals (water quality, soil quality, and ecological diversity) and quality of life (Kroma & Flora 2001).

Achieving such sustainable urban agricultural development requires changes in economic and social structures, organisation and institutional arrangements from time to time and from place to place. For such changes to be carefully predicted, assessed and understood there is need for a sound, intellectual input that clearly brings out the key issues and provides a frame work for appropriate policy action that will ensure that all capital institutions contribute significantly towards sustainable agriculture (Olomola 2002).

A ripple effect has been brought about by urban agriculture such that, small food industries have been started in some urban towns, which have been able to employ a few urbanites, thus encouraging the production of various foods. Therefore urban agriculture should be recognised as an integral part of the urban economy and as an important socio-economic activity since it acts as a supplement to household income thereby reducing poverty and food insecurity and encouraging sustainable development.

The 1986 UN Declaration on the Right to Development, enforces the human being as an active force in development and states explicitly that: Only when all human beings individually and collectively, with full respect for each individuals' human rights and fundamental liberties, take responsibility for development and recognise their obligations to the community, will the free and complete realisation of human potential be guaranteed.

Therefore, to respect, protect and facilitate the actions of individuals and communities in their quest to feed themselves and the goal of providing a healthy, active and participative quality life for all is the duty of the state. The state's action should involve measures that provide conditions for individuals, families and communities to participate in practical activities that are feasible to the production and use of nutritious food.

## **Conclusion**

Food security in recent years has been seen as one dimension of the broader concept of livelihood security. However, the relationship between urban food production, food security, urban livelihoods and sustainable development has been greatly neglected. Many cities in the world have vacant areas or land that can be legally planned for and used for urban agriculture purposes. The perceptions of the urban policy makers and development professionals committed to assisting the urban poor show that they have typically been blind to urban agriculture as a springboard to better lives.

The lack of awareness, recognition, promotion and management of urban agriculture has more to do with certain cultural attitudes whereby policy change is divorced from changing dynamics of urban occupation. It is hoped that as more information is availed on the logic of urban agriculture in sustaining the livelihoods of the urbanities, urban agriculture may be supported and better managed by governments.

Currently cities of the world are experiencing shrinking space, and disappearing borders are linking the periphery of the cities. Therefore city policies should address the new actors, new tools and new markets with new rules so as to achieve sustainable development.

## **Recommendations**

Urban agriculture plays an important role of providing livelihood opportunities to many urban dwellers. In many developing countries, Kenya included, this activity is not included in the urban planning systems. We strongly recommend a shift in the urban planning paradigm to include agriculture as an important urban land use. It should thus be included in urban development plans with zoning done for urban agriculture.

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## CHAPTER 3

# **SOCIO-ECONOMIC AND CULTURAL FACTORS INFLUENCING WOMEN'S REPRODUCTIVE HEALTH IN KENYA**

*Ruth Muthei*

### **Abstract**

A comprehensive lifespan approach to reproductive health deals with a number of **issues** of concern to women and men. However, the greatest burden of reproductive **health** problems falls on women. This is because women alone are at risk of complications of pregnancy and childbirth, face higher risks in preventing unwanted pregnancies, and besides bearing the burden of using contraceptives also **endure** their consequences. (WHO 1999:15; Jacobson 1991: 6). Further, women's reproductive health is closely related to their status and freedom. Therefore, high **rates** of reproductive illness and death are common where women are socially, economically, or politically disadvantaged.

This paper makes an analysis of a combination of factors that influence reproductive health of women. They include: poverty, lack of decision-making power and lack of information. The paper argues that there is interplay between culture and the socio-economic status of women that hinders them from achieving full health in their reproductive processes. The main focus is on married women.

### **Introduction**

The global concerns on women's reproductive health have yielded a number of positive results ten years after the International Conference on Population and Development (ICPD). Reproductive health in this context is the complete physical, mental and social well-being in all matters relating to the reproductive system, its functions and processes.

The United Nations Population Fund global survey at the culmination of ten years after ICPD, 2004 shows that there has seen considerable progress in integrating reproductive health as part of the health sector package (Kenya Demographic and Health Survey [KDHS] 2003).

However, despite the above-mentioned changes, the status of reproductive health of women remains uneven across and within countries of the world. Social, economic and cultural factors make access to contraceptives difficult for many women. Poverty, lack of decision-making power, distance and lack of good

information still prevent women, especially in rural areas, from reaching the services.

In Kenya, regional differences are noted in reproductive health indicators such as; maternal mortality, accessibility and acceptability of contraceptives depending on socio-economic and geographical distribution of people (KDHS 2003). The non-use of contraceptives by many women and youths results in pregnancies that pose death threats to women. Contraceptive use in this context is taken to mean any use of a family planning method, both traditional and modern such as; injectables, pills, periodic abstinence and withdrawal.

The paper discusses socio- economic and cultural components that impact on women's reproductive health with reference to contraceptive use, fecundity and maternal health care as indicators of women's reproductive health. Maternal health care involves three components namely; antenatal, delivery and postnatal care. The focus of the discussion is on married women.

### **Status of Reproductive Health of Women in Kenya**

The reproductive health status of women could be measured using various indicators such as; level of contraceptive use, fertility levels, reproductive health care, sexually transmitted infections and HIV/AIDS among others.

This paper addresses itself to only three indicators namely; contraceptive use, fertility levels and maternal health care. Three variables have been used to analyse the impact of culture and women's socio-economic status on their reproductive health. The variables are; Women's participation in decision-making, women's attitudes towards refusing sex with their husbands, and women's attitudes towards wife beating. These variables are meant to measure women's attitudes towards gender roles and control over their environment, both of which are relevant in understanding women's demographic and health behaviour. This paper draws its insights from secondary data. Statistical data has been solicited from countrywide household surveys conducted by the Kenya Demographic and Health Surveys in 1998 and 2003.

### **Women's Participation in Decision-Making**

To assess married women's decision-making autonomy, information was sought on their participation in five different types of household decisions as follows:-

- a woman's health
- making household purchases
- making household purchase for daily needs
- visiting one's family and relatives
- what food to be cooked each day

The autonomy of women in this case was gauged by the manner in which they make decisions on the cited issues, either independently or jointly with their spouses. The findings are presented in the Table 1.

**Table 1: Married Women's Participation in Decision-Making (%)**

Decision	Self only	Jointly with husband	Jointly with someone	Husband only	Someone else only	N/A	Total
Own health care	39.8	14.3	0.3	42.9	2.3	0.4	100
large household purchases	11.8	24.2	0.2	61.3	2.3	0.2	100
Daily household purchases	40.5	19.2	0.5	37.3	2.2	0.3	100
Visits to family or relatives	22.9	35.1	0.4	39.4	1.7	0.5	100
What food to cook each day	81	5.0	1.1	10.0	2.4	0.1	100

**Source:** Adapted from the *Kenya Demographic and Health Survey 2003* (Central Bureau of Statistics. Ministry of Health & ORC Macro. Calverton: Maryland 2004). 2

Table 1 shows that among married women, independence in making decisions ranges from 81% on what food to cook daily to only 12% on making large household purchases. About 40% women make decisions on their own health care while 43% have their husbands make such decisions independently.

Further, a woman's economic status increases her chances of decision-making in a family. 38% of employed women participate in making all decisions compared with 12% of unemployed women (KDHS 2003, 43).

### **Women's Attitudes towards Refusing Sex with Husbands**

The extent of control women have over when and with whom they have sex has important implications for demographic and health outcomes, such as transmission of HIV and other STIs. In as much as sexual activity is behaviour negotiated between two partners, the fact that the behaviour is negotiated within a wide social, cultural and economic context points to the issues of power. In most African communities, power differentials between men and women concerning sexual partners are unbalanced limiting women's negotiating power with respect to

sexuality and reproduction. Men appear to control the conditions of sexual intercourse including condom and contraceptive use, (Luke and Kurz 2002).

To measure beliefs about sexual empowerment of women, women and men were asked their opinions on a wife's justification in refusing to have sex with her husband in the following circumstances:-

- When she knows that her husband has an STI
- When she knows that her husband has sex with other women
- When she has recently given birth
- When she is tired or is not in the mood

The results are as follows: 50% of women and 56% of men agree that all the above reasons are rational justifications for a woman to refuse to have sexual relations with her husband, (Note that the male percentage is higher). Only 7% of women and 2% of men agree with none of the reasons (Note the percentage of women is higher). These responses point to male dominance in matters of sexuality, and women's support to such dominance.

The most accepted reasons for refusing to have sex among women and men are if the wife knows her husband has an STI, and if she has recently given birth. The least acceptable reason to both men and women respondents is that of being tired or not in the mood. It appears that the issue of men having multiple partners is widely accepted in Kenyan communities by both men and women.

Further, women and men who live in the rural areas, uneducated respondents, unemployed respondents, women who have no say in household decisions, and poorer women are the least likely to agree with all the reasons for refusing sex (KDHS 2003).

### **Women's Attitude Towards Wife Beating**

Violence against women is an area that is increasingly affecting women's health and autonomy. This is because such violence has serious consequences for women's mental and physical well-being, including their reproductive and sexual health (WHO 1999). Evidences from crisis centres, police reports and ethnographic research show that violence against women is a significant cause of injury and ill-health. They include: chronic headaches, abdominal pains, muscle aches, recurrent vaginal infections, and sleep and eating disorders. Abused women frequently become isolated and withdrawn as they try to hide the evidence of their abuse. Battering and sexual health tend to go together whereby, proportions of women with physically abusive partners also experience sexual abuse (Jejeebhoy 1998; Heise, Pitanguy and Germain 1994).

The threat of violence limits a woman's ability to make reproductive choices in terms of whether or when to become pregnant, whether and what steps to take to

control fertility, or which method of contraception to adopt. This limitation exposes women to unwanted pregnancies and its related health consequences. In most patriarchal communities such as those found in Kenya, a husband has the ultimate say in family issues including the number of children to have and the fertility method to be used. In such families, women who suffer violence are more likely than other women to experience unwanted pregnancies and constrained contraceptive choices. Women are often, either reluctant to use contraception for fear of abuse by their husbands or have indeed suffered severe beatings after their contraceptive sexual behaviour was discovered by their husbands (Jejeebhoy 1998).

The prevalence and health consequences of violence against women are estimated to account for 50% of the health years of a life lost to a woman of reproductive age in demographically developing countries. At the root of violence against women lie unequal power relations and unequal control of resources between women and **men**. Power dynamics strongly influence or constrain women's ability to exercise **choices** that would enable them to resist abuse. Societal norms about gender relations often reinforce this lack of choice (Jejeebhoy 1998; Heise, Pitanguy and Germain 1994).

Women and men interviewed were asked whether they thought a husband would be justified in hitting or beating his wife in each of the following five situations:

- If she burns food
- If she argues with him
- If she goes out without telling him
- If she neglects the children
- If she refuses to have sexual relations with him.

Overall, about 66% of Kenyan women and men agree that at least one of these factors is sufficient justification for wife beating. This is not unexpected because many traditional customs in Kenya expect women to accept and tolerate wife beating (KDHS 2003).

The most widely accepted reasons for wife beating are; neglecting children (55% women and 50% men), and arguing with the husband (46% of women and 41% of men). Forty percent of women and 33% of men think that going out without informing the husband is a justifiable reason for wife beating. Twenty-five percent of women and men feel that denying sex to the husband is a justifiable reason for wife beating (KDHS 2003).

Acceptance of wife beating for at least one of the specified reasons, is lower among urban women and men as well as among those in Nairobi Province. Women in Nyanza Province and men in North Eastern Province are the most likely to agree that, wife beating is justified for some reason. Acceptance of wife beating declines steeply as the level of education increases. Poorer women and men are more likely

than their wealthier counterparts to believe that wife beating is justifiable (KDHS 2003).

From the foregoing discussion, it is evident that culture, level of education and socio-economic status influence women's and men's attitudes towards domestic violence. These factors further influence women's access to reproductive health services as is seen later in the paper.

The following section discusses the three variables: women's participation in decision making, women's attitudes towards refusing sex with a husband, and women's attitudes towards gender violence, as described in the foregoing section, in the light of three reproductive health indicators namely: contraceptive use, fertility and maternal health care.

### **Use of Contraceptives by Married Women in Kenya**

The Kenya family planning programme was launched in 1997, and since then it has made substantial progress in expanding the use of contraception in Kenya. According to the 1998 Kenya Demographic and Health Survey, the contraceptive prevalence rate among married women were 33% in 1993 and 39% in 1998. According to the KDHS 2003, 64% of married women use contraceptives. Though, there seems to be a remarkable increase in the percentage of contraceptives usage, the current percentage is still low. There is still a large proportion of non-users.

Reasons for low usage of contraceptives include; low education among women, male preference for large families, replacement due to high child mortality, religious prohibitions and cultural practices that favour many children preferably sons (KDHS 2003: KDHS 1998). Contraceptive use increases with the level of education. For instance, use of modern methods increases from 8% among married women with no education to 52% among women with secondary education. Better-educated men are more likely to approve of use of contraceptives, as are men in monogamous marriages and those in urban areas.

Several factors combine to impede women's access to contraceptives. They include among others, lack of information, unavailability of services, long distance from a health facility, fees required in some health facilities and lack of approval by husbands.

**Table 2: Current Use of Contraceptives and Mean Ideal Number of Children (%) by Married Women in Kenya According to Selected Indicators of Women's Status**

Women's status indicator	Any method	Any modern method	Any traditional method	Mean number of children
<b>Number of decisions in which woman has final say</b>				
0	22.2	18.1	4.2	
1-2	30.6	24.1	6.5	4.5
3-4	43.9	35.5	8.5	4.0
5	49.2	39.6	9.6	4.1
<b>Number of reasons to refuse sex with husband</b>				
0	28.2	22.1	6.1	5.1
1-2	36.2	28.7	7.5	4.8
3-4	40.7	32.8	8.0	4.1
<b>Number of reasons wife beating is justified</b>				
0	49.2	40.8	8.4	3.8
1-2	41.0	32.7	8.4	4.0
3-4	32.2	25.1	7.1	4.7
5	27.3	21.1	6.2	4.9

**Source:** Adapted from the *Kenya Demographic and Health Survey 2003* (Central Bureau of Statistics, Ministry of Health & ORC Macro Calverton: Maryland 2004), 73; 121

Table 2, shows that the recurrent use of a modern contraceptive method increases steadily with the number of decisions in which a woman has a final say, from 18% among married women with no say, to 40% among women who participate in five decisions. The more reasons a married woman cites for justifying a wife's refusal to have sex with her husband, the more likely she is to be currently using a modern contraceptive method. 22% women believe that there is no justifiable reason for refusing sex with a husband. 33% women give 3-4 reasons for refusing to have sex with a husband.

Similarly, women who do not believe there is any reason to justify wife beating, are more likely to be using a modern contraceptive method than those who feel that wife beating is justified. Current use of modern contraceptives decreases from 41% among women who do not believe in any reason to justify wife beating to 21% among those who report five reasons in which wife beating is justified.

### **Fertility Levels and Women's Social Status**

Proximate determinants of fertility include; marriage, sexual intercourse, onset of menopause and contraceptive use.



The onset of childbearing has a direct bearing on fertility. Early initiation into childbearing lengthens the reproductive period and subsequently increases fertility. In societies in which virginity at marriage is considered absolutely essential, girls are often married off at extremely young ages frequently to men many years their seniors. The major contributing factor to child marriages is the acquisition of bride wealth. These child brides are traumatised by adult sex and forced to bear children before their bodies are fully mature. A common side effect of very early childbearing is vesico-vaginal fistula, a condition caused by prolonged obstructed labour and lack of access to health care. Societies that practice child marriages have high levels of illiteracy among women, a contributing factor to poverty and ignorance (Heise, Pitanguy and Germain 1994).

The Kenya Demographic and Health Survey 2003, found that, the previously documented decline in fertility appears to have stalled. Fertility rate ranged between 4.7-5.0 between 1999-2003. The total fertility rate is higher in rural areas 5.4 children per woman compared with 3.3 per woman in the urban areas. Regional differences are also noted within Nairobi Province being the lowest with 2.7, Central 3.4. Nyanza 5.6, Rift Valley and Western 5.8 and North Eastern 7.0 children per woman (KDHS 2003).

It has generally been hypothesised that individuals who are educated, who are working in the modern sector, whose spouses are educated, and who are living in urban areas have lower fertility than do individuals who are not working outside the home and are living in the rural areas. Education of women is strongly associated with lower fertility. The total fertility rate decreases from 6.7 for women with no schooling to 3.2 for women with at least secondary education. Similarly, working women have lower fertility rates than women who are not working. The total fertility rate for working women is 4.7. while that of women not working is 5.3 (KDHS 2003).

In some cultures, a woman's value is dependant on her presumed or demonstrated fertility. In some parts of Africa, women who are unable to bear children are subject to abandonment, abuse, neglect and at times, murder. In a similar tone, in most cultures, women are only revered as mothers of sons. This makes them to have repeated births in search of sons, a practice that contributes to high fertility rates. Cases are cited of women abandoned in hospitals for constantly giving birth to girls only. Some women are also battered, at times to death, for giving birth to "yet another girl". A victim of domestic violence had this to say:

My husband was very angry with me because I had only given birth to three girls. Five months after the last birth, he beat me violently and told me that he was going to kill me. He threw me on the ground and kicked me for having had another girl and said he was going to give her away (Oral interview with Akinyi, Kenya).

The ability of women to effectively make decisions, has important implications on their fertility preferences and practice of family planning. Generally, unmet need (women not using family planning, with mistimed and unwanted pregnancies), and ideal family size are related to a woman's status.

Mean ideal family size declines as the number of decisions in which a woman has a final say and the number of reasons to refuse sex with the husband increases. Similarly, women who think wife beating is not justified for any reason, have a mean ideal family size of 3.8 compared with 4.9 for women who gave five reasons why wife beating is justified (See Table 2).

Women who give no reason to justify wife beating, have an overall unmet need of 18% compared with 29% for those who give five reasons. Unmet need is also lower among women who participate in more household decisions, as shown in Table 2.

## **Maternal Health Care**

This includes antenatal, postnatal and delivery care. Around the world, people celebrate the birth of a new baby. Societies expect women to bear children and honour women for their role as mothers. Yet, in most of the world, pregnancy and childbirth is a perilous journey for women. In developing countries, more than half a million mothers die from causes related to this life-giving event annually. In Sub-Saharan Africa, one in every 13 women, dies of pregnancy related causes during her lifetime (Ransom and Yinger 2002).

Further, for every woman who dies, approximately 30 more women suffer injuries, infections and disabilities during pregnancy and childbirth. These pregnancy-related health problems include severe anaemia, infertility and damage of the uterus and reproductive tract strained during childbirth. Unfortunately, many women are too ashamed to speak about these and other conditions or to seek treatment for them. This 'culture of silence' is exacerbated in settings where women are not empowered to make choices concerning their health (Ransom and Yinger 2002, 7).

Complications related to pregnancy and childbirth, are among the leading causes of morbidity and mortality of Kenyan women. Estimates suggest that, there are 590 deaths per 100,000 live births representing one in 36 lifetime risk of dying from a maternally related cause. Hospital based studies show that the majority of these deaths are due to obstetric complications, including haemorrhage, sepsis, eclampsia, obstructed labour and unsafe abortion (Kenya Service Provision Assessment KSPA 1999).

Research findings show that, 88% of women in Kenya receive antenatal care from a medical profession, either from doctors (18%) or nurses or midwives (70%). While 2% receive antenatal care from traditional birth attendants, while 10% do

not receive any antenatal care. Rural women are less likely than their urban counterparts to get antenatal care from a doctor and more likely not to get care at all. Women's education is associated with antenatal care coverage. Women with higher education are much more likely to have received care from a medical doctor than those with no education (20% versus 15%), while the proportion of women who get antenatal care declines steadily as education decreases (KDHS 2003).

Ensuring that women receive skilled care at delivery is an essential part of safe motherhood programs. Skilled care, however, can only be effective in the context of health systems that address women's health and the obstacles women face en route to emergency care. Effective health care systems make obstetric care available to all women, including surgical and technical interventions required to treat life-threatening conditions during pregnancy, delivery and after birth (Ransom and Yinger 2002).

### **Delivery Care in Kenya**

The objective of providing safe delivery services is to protect the life and health of the mother and her child. Proper medical attention under hygienic conditions during delivery can reduce the risk of complications and infections that may cause death or serious illness either to the mother, baby or both.

Kenya Demographic and Health Survey (2003) found that, 40% of births in Kenya are delivered in a health facility while 59% are delivered at home. Similarly, rural children are twice more likely to be delivered at home than urban children. The proportion of children born at home decreases with increase in education, and wealth quintile of the mother.

The type of assistance a woman receives during birth, has important health consequences for both the mother and the child. In Kenya, only 41% of births are delivered under the supervision of a health professional, (11% by a doctor and 30% by a nurse or midwife). Traditional birth attendants continue to play a vital role in delivery, assisting with 28% of births. Births in urban areas and those whose mothers have more education or are in wealthier quintiles are more likely to be assisted by medical personnel than those whose mothers are rural, have less education, or are in poorer wealth quintiles.

Regional differentials in type of assistance at delivery are also pronounced, with North Eastern Province recording the lowest proportion (9%) of births assisted by medical professionals, followed by Western Province (29%). Nairobi has the highest proportion of births assisted by medically trained personnel (79%). The proportion of births assisted by medically trained personnel has remained constant since 1998, at 44% (KDHS 2003).

Postnatal care is important for mothers for treatment of complications arising from delivery, especially for births that occur at home. To provide the best outcome

possible, it should occur within two days of delivery since this is the critical period when most maternal deaths occur. In Kenya, 81% of women who deliver outside a health facility do not receive postnatal care. Only 10% attend postnatal within two days of delivery. Women with at least some secondary education and those in the highest wealth quintile are more likely to utilise postnatal services than other women (KDHS 2003).

Antenatal, delivery and postnatal care coverage differ according to certain measures of women's status. Women who are in a position to make decisions in their households have a higher percentage of receiving reproductive health services (maternal care) as shown in the Table 3.

**Table 3: Reproductive Health Care (%) of Married Women by Women's Status**

Women's status indicator	% of women who received antenatal care from a doctor, nurse or midwife	% of births for which mothers received delivery care from a doctor, nurse or midwife	% of women who received postnatal care within first two days of delivery	Number of women
<b>Number of decisions in which a woman has final say</b>				
0	83.0	42.7	48.2	503
1-2	86.8	35.2	41.7	1307
3-4	91.1	44.7	52.9	1255
5	88.7	46.1	52.9	986
<b>Number of reasons to refuse sex with husband</b>				
0	78.4	34.1	37.2	248
1-2	85.3	35.3	42.5	603
3-4	89.4	43.3	50.7	3201
<b>Number of reasons wife beating is justified</b>				
0	89.9	54.6	59.0	1090
1-2	90.1	41.6	50.0	1303
3-4	85.3	35.2	41.8	1221
5	85.3	30.1	38.2	438

**Source:** Adapted from the *Kenya Demographic and Health Survey 2003* (Central Bureau of Statistics, Ministry of Health & ORC Macro Calverton: Maryland 2004), 136

The number of reasons for which women feel that, a wife is justified in refusing to have sex with her husband has a stronger positive relationship with all the three variables. For example, the proportion of women who receive postnatal care within two days of delivery increases from 37% among women who think a wife is not justified in refusing to have sex with her husband for any of the specified reasons to 51% of those who said 3-4 reasons cited were justifiable. On a similar note, women who say wife beating is not justifiable have 55% of their births attended to by medical professionals compared to 30% of births to women who say wife beating is justifiable.

## **Conclusion**

**This** paper clearly establishes that there is interplay between women's socio-economic status, culture and their reproductive health. We have described the status of women in Kenya with regard to contraceptive use, fertility levels and maternal health care as indicators of a woman's reproductive health. While acknowledging that, there are numerous factors that impinge on women's access to adequate reproductive health care such as availability of, and accessibility to a health facility, this paper has argued that cultural and socio-economic factors greatly impact on women's reproductive health.

We have also made an analysis of women's decision-making power, sexual autonomy and attitude towards gender violence. Cultural influence is seen in men's control of the health of their wives' decisions on the number of children to be born, control of their wife's sexuality, as well as both men and women's support of gender violence. Men make major decisions in a household. Women's levels of education, employment and wealth compound these factors. The more educated and wealthy a woman is, the more empowered she is in matters of her health, in deciding the number of children she gives birth to, and the kind of maternal care she receives.

A woman's educational level gives her an upper hand in acquiring economic power, which in turn puts her in a position to make decisions in her house and makes her better placed in accessing reproductive health services than with those with low education. This woman is in a position to make decisions concerning her health and probably finances it. Similarly, the more educated and wealthy a woman is, the less supportive she is to wife beating and the more supportive she is to sexual empowerment.

## **Recommendations**

For women to be able to use reproductive health services, the services should be available, accessible and affordable. The services include; family planning, treatment of sexually transmitted infections, cancer screening, counselling among others. The Kenya Service Providers Assessment report 1999, shows that 44% facilities charge for family planning services. Of these, 50% are mission-operated and 80% are private facilities. In addition to these, there is need for outreach programmes that could be used to extend health services coverage in areas where populations are dispersed and where access to services is poor.

There is need to train more professionals to give services on maternal care, especially delivery. The percentages of women who receive assistance from such personnel are negligible particularly in rural areas and at facilities below the hospital level.

For women, illiteracy is a major contribution to lack of resources as well as lack of decision-making power in matters of reproductive health. Throughout the paper, we see a correlation between literacy, wealth quintiles, and decision-making power, sexual autonomy and access to better reproductive health services. Wealth decreases as illiteracy increases with the poorest women having high fertility levels, poor maternal care and less use of contraceptives. In view of this, empowerment of women enables them to articulate their health needs and concerns, access services with confidence and without delay, and seek accountability from service providers and program managers.

Generally, there is need to challenge social attitudes and beliefs that under gird male dominance over women. Coupled with this, is the need to renegotiate the meaning of gender, sexuality and the balance of power between women and men at all levels of society. There should be open debates on some of the cultural beliefs and practices to raise awareness on those that are potentially harmful to women such as domestic violence.

There is need to promote the education of women. A woman who has access to education is able to enhance not only her health but also that of her family and community. She is able to make own choices on family planning, to protect herself from reproductive tract infections or to avoid HIV infection. Women, and the community at large need to be educated and brought to a better understanding of harmful effects of certain prevailing customs and practices. To achieve this objective, there is need to persuade elderly women and men, husbands, village chiefs and community leaders about the adverse effects of unhealthy social and cultural practices in order to put them to an end.

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**PART TWO:**

**CULTURE, EDUCATION AND  
DEVELOPMENT**



**IMPACT OF LUNCH PROGRAMMES ON  
PRIMARY SCHOOL ATTENDANCE IN VIHIGA  
DISTRICT, KENYA**

*Musamali Betty*

**Abstract**

Malnutrition and disease continue to pose a great deal of threat to schoolchildren. Arguably, nutritional deficiencies are responsible for poor school enrollments, absenteeism, early dropout, and poor classroom performance. Nutrition interventions can however help children to exhibit catch up on growth, with improvements in school enrollments, attendance and ultimately performance. In Kenya, the school lunch programme is an example of such interventions. The intervention has been implemented in several Districts, Vihiga District being among them. This paper reports findings of a study whose purpose was to determine the role of School Lunch Programmes in improving the attendance of school children in Emuhaya Division, Vihiga District Kenya. The objectives of the study were: to compare the attendance of participants (children who participate in the school lunch) and non-participants (children who do not participate in the school lunch) and to assess the diet quality of the school and home lunches. It was hypothesised that School Lunch Programmes improve school attendance. A sample of 320 pupils (study children) and their parents were randomly selected for the study. A cross-sectional survey design was adopted. Interview schedules, school registers, 24-hour recall and observed weighed techniques were used in data collection. Frequencies, means, multiple regressions and food composition tables were employed in data analysis. The results indicated a positive association ( $p < 0.05$ ) between the school lunch programme and attendance. The diet quality of the school lunch and attendance of participants were significantly higher ( $p < 0.05$ ) than the home lunch and attendance of the non-participants. The study therefore concluded that the School Lunch Programme in Emuhaya Division plays a positive role in improving the attendance of participating children. School Lunch Programmes should be encouraged in this Division and many other food deficit areas in the country.

**Introduction**

Health, education and nutrition support are interdependent entities. Healthy nutritional status improves educational potential by positively affecting attention span, learning capacity and ability to engage fully in educational experiences

(Andrea 2003). Undernourishment in early childhood can negatively influence school aptitudes, time of school enrolment, school attendance as well as concentration (FAO/WHO 1992). Schools are therefore ideal settings for nutrition programmes and services, because nutrition and education are closely linked. Nevertheless dietary, hygienic and exercise habits that affect nutritional status are formed during the school-age years (*ibid*). Although not a panacea, school feeding and related food assisted education activities can directly address many of the educational constraints related to health and nutrition. Evidence strongly suggests that School Feeding Programmes (SFP) and take-home rations (food to take home to their families given to students who achieve attendance standards) result in higher attendance rates, lower drop out rates and improved performance (Andrea 2002).

School Lunch Programmes (SLP), are achieving increasing attention as a method of improving nutrition, health and education of children. The Government of Kenya (GoK) in collaboration with World Food Programme (WFP) introduced SFP in Kenya in 1980. The objectives of the programme were to improve attendance levels, nutritional status and academic performance of participating children by providing a nutritious midday meal to pupils. The programme covers arid and low potential areas, which are poor, have food deficits and school enrollment levels that are below the national average of 87%, (FAO/WHO 1992).

Some of the areas not covered by this programme have however adopted a system whereby a midday meal is provided at school at low cost. Parents contribute money for the meal. The meal is based on locally produced food and it is intended to make up for possible food and nutrient imbalances in the children's daily diet. In Vihiga District the SLP was introduced between 1990 and 1995.

The residents of Emuhaya Division of Vihiga District experience food shortages almost throughout the year due to small farm sizes and high population density. A preliminary survey conducted by Compassion International in 1994 revealed high levels of malnutrition among school children, poor enrollment and low attendance. Compassion International initially supported the SLP in Emuhaya Division, but has now withdrawn due to financial constraints. The Vihiga District Development Plan, indicates that schools that were supported showed improved academic performance as well as enrollment and attendance (Government of Kenya 1997-2000). Since then, a number of schools begun running their own SLP with a view to improve enrollment, attendance and academic performance. So far, there has been no evaluation of this effort to determine whether the objectives have been met. Evaluation would be useful in highlighting the strengths and weaknesses of the SLP so that necessary adjustments are made to improve the outcome.

This study was conducted to determine the impact of SLP on school attendance levels of primary school children in Emuhaya Division. It was hypothesised that SLP improves school enrollment and attendance. The study was guided by the following objectives:[I] to compare the attendance of participants (children who

participate in the school lunch) and non-participants (children who do not participate in the school lunch) and [2] to assess the diet quality of the school and home lunches. It was hoped that the findings of the study would be useful in evaluation of the SLP in Vihiga District and other areas with similar programmes.

## **Methodology**

### ***Study Area***

The study was carried out in Emuhaya Division, Vihiga District, Western Province. The District occupies a total area of 541 km<sup>2</sup>, with an altitude ranging between 1,300 m and 1500m above sea level (Government of Kenya 1997-2000). The District's annual rainfall ranges between 1800mm to 2000mm. Emuhaya Division is on the leeward side of the Maragoli hills and it therefore receives low amounts of rainfall. This is likely to negatively affect food production in the area. Temperatures in the District range between 14°C to 32°C. Population estimate for the District is 590,000 persons constituting 73,751 households. The population density is approximately 1091 persons per km<sup>2</sup>. The average family size is 8 persons while the mean farm size is slightly less than 0.6 ha or 1.5 acres (*ibid*). The Division was chosen because it experiences food shortages due to limited land, a factor likely to compromise food intake and hence nutritional status of school children. Poor nutrition and hunger affects the school attendance of school children.

### ***Study Population and Sample Size***

The study population comprised of class five and six pupils from mixed day public primary schools in Emuhaya Division. These classes were chosen because the pupils were likely to have participated in the SLP for at least two years, since most children start participating in the programme at class three. It was assumed that a minimum of two years participation in the programme would be adequate to demonstrate the impact of the programme on school attendance of the children.

A sample of 320 pupils representing participants and non-participants in the SLP was randomly drawn according to the formula developed by Fisher *et al.*, (1991) for comparative studies. This study adopted a cross-sectional survey design in which eight (8) schools were randomly picked from 16 schools with SLP. Two schools were randomly picked from each of the locations of Emuhaya division. One parent for each of the study children was selected to provide information on their demographic and socio-economic characteristics.

## Data Collection Instruments and Procedures

Data was collected using an interview schedule, 24-hour recall, observed weighed technique and school registers. The interviews were conducted with pupils and their parents to yield information on demographic and socio-economic characteristics of households, school attendance as well as parents' opinions about SLP. School registers were used to verify data collected on school attendance. The 24-hour recall yielded data on kinds and volumes of foods and nutrients that the non-participants ate at home during lunch to establish the diet quality of the home lunch. For the observed weighed, technique that was used to establish the diet quality of the school lunch, volumes of food portions served and consumed by the participants was measured as well as the leftovers. The proportions of the ingredients used in cooking and the total volume of the food cooked were also measured. The nutrients consumed in both groups were then computed using the food composition tables for East, South and Central Africa (WHO 1987).

## Data Analysis

Data was analysed both quantitatively and qualitatively with aid of the Statistical Package for Social Sciences (SPSS). Frequencies, means, standard deviations, were generated and used in the descriptive analysis. Multiple regression analysis was used in establishing the association between SLP and school attendance of the index children. The SLP was the independent variable while school lunch was the independent variable. Diet quality of the school and home lunch were analysed using the food composition tables.

### *Schools Attendance of Participants and Non-Participants in SLP*

Results are summarised in Tables 1, 2, 3 and 4.

**Table I: School Absenteeism among Participants and Non-Participants in the SLP**

School absenteeism	Participants		Non-participants		P value
	n	%	n	%	
Present	126	78.8	79	49.4	0.02*
Absent	34	21.3	81	50.6*	0.01*
Total	160	100	160	100	

$\chi^2=29.98$

df= 1

\*X significance at  $p<0.05$

n=number

Table 1, shows school absenteeism (failing to attend school as scheduled) among Participants and non-participants in the SLP. School absenteeism was significantly higher ( $P<0.05$ ) among the non-participants than participants. Attendance levels of Participants were better than those of the non-participants. Similar results have been reported elsewhere. Many children reportedly enrolled in the schools, and some tended to start schooling earlier because of the School Lunch Programme

SLP is an incentive for parents to send their children to school (International Food Policy Research Institute [IFPRI] 2004). In highlighting the financial plight of the SFP in poverty stricken areas, the report reiterated that many school children would have to drop out of school due to hunger if there was no school lunch. Moreover, many parents would see no reason to send children to school. In some areas, SFP is a source of livelihood.

Regression coefficients were significant ( $p < 0.05$ ) for association between absenteeism from school and the school lunch, and adequate kilocalorie and protein intake at school was strongly associated ( $p < 0.05$ ) with reduced absenteeism. This association was positive. This may suggest that participants had less worries over their lunch and therefore inspired to attend school as scheduled. Non-participants, may have possibly been forced to stay at home to assist in searching for food. Evaluation of a school lunch programme by Cotten (1982) in Haiti also revealed a positive relationship between the school lunch and attendance. Similarly the WFP school-feeding programme has been reported to have led to increased and stabilised school enrollment and maintained attendance in some beneficiary districts in Kenya (UN/WFP 1992).

**Table 2: The Number of Days Absent from School by Study Children**

Days absent from school	Participants		Non-participants		P value
	n	%	n	%	
2 times and below	8	22.9	8	9.9	0.06
3 times	8	22.9	15	18.5	0.05
More than 3 times	19	54.3	58	71.6	0.03*
<b>Total</b>	35	100	81	100	

$\chi^2 = 22.07$

df = 2

\* $\chi^2$  significance at  $p < 0.05$

n=number

Table 2 indicates that the number of days non-participants missed school were significantly higher ( $P < 0.05$ ) than the participants. This supports the hypothesis that attendance levels of participants are better than those of the non-participants. Regression coefficients with school lunch variables; kilocalorie and protein intake were significant ( $P < 0.05$ ) for the number of days study children were absent from school as shown in Table 3. This implies that participants in the SLP tended to attend school more regularly than the non-participants did. This may suggest that the school lunch when well organised plays an important role in improving the school attendance levels of school children.

**Table 3: Reasons for Missing School by Study Children**

Reasons for missing School	Participants		Non - participants		P value
	n	%	n	%	
Lack of school funds	0	0	16	10	0.02*
Sickness	26	16.3	15	9.4	0.03*
Hunger	1	0.6	43	26.9	<b>0.001*</b>
Other reasons	9	5.6	6	3.8	0.05(NS)
No reasons	124	77.5	80	50.0	0.01*
<b>Total</b>	<b>160</b>	<b>100</b>	<b>160</b>	<b>100</b>	

$\chi^2= 69.13$  df= 4      \* $\chi^2$  significance at p <0.05      NS= Not significant.      n=number

Coursin (1982) reported similar results in a study in Tokyo where the children who received school lunch were more cheerful, attended school more regularly and were better at athletics than the controls. Consequently, the launching of the National School Milk Programme in Kenya by the presidential directive in 1978 was a move to ensure better health and nutritional status of the school children and therefore an improvement in school enrollment, attendance and academic achievement (Government of Kenya 1978). An evaluation of a School Nutrition Programme in Jamaica also found out that the provision of breakfast resulted in higher school attendance and greater achievement in arithmetic (Andrea 2002). An evaluation of the impact of a Mid Day Meal (MDM) Programme in 60 primary schools in India reported significantly higher enrollment, attendance, and retention rates with reduced dropout rates among MDM programme children (*Ibid*).

### Factors Contributing to Absenteeism from School

Study children who had missed school gave various reasons for doing so. More than a quarter (25.7%) of the index children in both groups missed school because of sickness while 9.4% missed school because of other reasons such as helping with household chores and taking care of other siblings, while their mothers were away (Table 3). The number of study children absent from school because of hunger was significantly higher ( $P<0.05$ ) among non-participants (26.9%) than the Participants (0.6%).

It can be deduced that the school-lunch plays an important role as far as regular school attendance is concerned. Participants who miss breakfast and maybe supper at home are at least assured of school lunch and therefore encouraged to go to school unlike the non-participants. It may be possible that non-participants stay at home for fear of lack of concentration in class due to hunger. According to Andrea (2003), hungry children are less likely to go to school and less likely to concentrate. Coursin (1982) also agrees that hunger in the classroom is generally believed to lead to lethargy, apathy and inability to pay attention. The children may also be required to assist in doing some other work-for-food duties. Andrea (2003) reports that, for poor households in rural areas, basic survival and sustenance issues can understandably take precedence over education. Rural families often count on their children's labor for tasks like farm work, childcare and finding food. Thus,

the school lunch may act as an incentive for school children to go to school everyday especially those who miss some meals at home.

**Table 4: Regression Coefficients of Dependent Variables with the School Lunch**

Dependent variables	Kilocalorie intake	Protein intake	P values
School absenteeism	1.2172*	1.2001*	0.006
Number of days absent from school	1.2464*	1.2176*	0.032
Reasons for missing school (hunger)	2.1289*	2.1468*	0.036

\*Significance at  $p < 0.05$

Table 4 shows that there was a significant relationship ( $P < 0.05$ ) between hunger as a reason for missing school and the school lunch. Participants in the school lunch hardly missed school because of hunger as compared to the non-participants. According to CBS (1991) the school-feeding programme is aimed at reducing hunger so that children can attend school more regularly. In a study conducted by Majorie (1983) in the USA, twenty schools that had received hot lunches for one year revealed a higher increase in attendance rate compared to the ten that had not received lunch at any time.

### Opinions about the School Lunch

Parents of study children gave their opinions regarding the school lunch. More than a third (44%) of the parents in both groups, agreed that the school lunch plays an important role in improving class concentration, while 15% and 17% supported the improvement of nutritional status and encouragement of regular school attendance respectively. A few (13%) indicated that it saves children from walking long distances when going home for lunch which makes them fatigued and unable to concentrate in the afternoon classes. The rest (11%) agreed that the school lunch is convenient. Similar findings were demonstrated by Marjorie (1983) and supported the fact that, FAO advocates feeding programmes as a means of improving nutrition of vulnerable groups of preschool and even school age children. This would then improve their school enrollment, attendance and academic achievement. Walking long distances for lunch also makes the children fatigued. This could also affect their concentration in the afternoon classes. In this case, the school lunch becomes convenient for them.

### Diet Quality of the School and Home Lunch

The school lunch, which consisted of maize and beans in the selected schools, provided each child with 841 kilocalories, which is 88.8% of RDA and 40g of protein, which is 33.6% of RDA. This provided the pupils with more than 1/3 of the Recommended Daily Allowance. School lunches should provide 1/3 to 1/4 of

the Recommended Daily Allowance because lunch is one of the three or four major meals that a person eats in a day. Pollit (1990) also agrees that foods provided for school age children should satisfy the high demands of rapid growth, intense physical activity and mental development. Consequently, in cases of wasted school children, SFP are required to correct moderate wasting and prevent moderately undernourished children from becoming severely undernourished, which is more likely to affect school attendance due to illnesses. Thus, the school lunch programmes should be nutritionally adequate to achieve this objective.

The Government is urged to consider the issue of "adequate" nutrition for school children in hardship areas as it implements the free primary education. Benefits of SFP cited in this article included: improved attention of pupils in class, ease of burden for parents, improved attendance, enrollment as well as nutrition. The nutrition aspect is therefore of utmost importance in SFP.

On the other hand, the home lunch for the non-participants provided each child with 720 kilocalories, which is 28.8% of RDA and 24g of protein, which is 53.3% of RDA. The lunch nutrient intake of the participants was significantly higher ( $p < 0.05$ ) than that of the non-participants. This means that the school lunch contributed significantly to the total daily nutrient intake of participants. This may suggest that the school lunch significantly enhanced their nutritional status and therefore higher attendance levels among them as compared to the non-participants.

## **Conclusions**

The attendance levels of participants were significantly higher ( $P < 0.05$ ) than those of the non-participants. The school lunch provided more calories and proteins to participants in the SLP than that provided by the home lunch to the non-participants. There was a significant association ( $P < 0.05$ ) between the school lunch and attendance levels. From these results, it can be concluded that the SLP in Emuhaya Division plays a positive role in improving the attendance levels of participating children.

## **Recommendations**

The SLP should be encouraged to continue due to its positive outcome. The government should extend the sponsored SLP to Emuhaya Division because it is an area that experiences food shortages almost throughout the year, which affects the school attendance of school children. Organisations concerned with children's welfare like United Nations Educational, Scientific and Cultural Organisation (UNESCO), United Nations Children's Fund (UNICEF) and World Vision should be encouraged to support the SLP in Emuhaya Division since children on the Programme have demonstrated a positive effect on attendance levels of school children.



**Food** mechanisms that increase food production and distribution through food processing, preservation, and storage should be fostered to ensure continued and **easy** access of food by women and children in this community. Opportunities that increase women's access to income should be promoted. Other community development projects could be initiated in order to empower the community economically. This could improve the socio-economic status of non-participating households so that they are also able to participate in the SLP as well. Finally, all parents and schools in Emuhaya division and Vihiga District at large should be encouraged to venture into the programme of SLP because of its positive outcome on attendance levels of school children.

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## CHAPTER 5

# ENHANCING DEMOCRACY IN KENYA THROUGH SOCIAL STUDIES EDUCATION

*Nabiswa M. "Wasike*

### **Abstract**

The sustenance of the current democratic dispensation in Kenya, as elsewhere in Africa will to a large extent depend on the level of political awareness among the citizens. Equipping the masses with knowledge, skills and attitudes about democracy carries the potential of enhancing their competence in political participation and the overall development of their country. Kenya, like many African countries did not take seriously the political education of its people in the past. For instance, the previous primary school civic education curriculum was criticised for being shallow and ineffective in preparing the country's youth to cope with social, economic and political challenges of the time. Consequently, the masses succumbed to authoritarian whims of the political elite with disastrous results to the development of the nation. The new primary school social studies curriculum introduced in 2002 can be seen as a serious attempt to correct this anomaly. This paper examines the role of the new syllabus in enhancing political awareness among its clientele as an important step in widening the democratic space in the country.

### **Introduction**

The clamour for democracy in Africa that started in earnest in the late 1980s marked the beginning of a very important political process aimed at correcting some of the socio-economic and political problems that had plagued the continent since independence. The impetus towards this new political dispensation, was occasioned by the failure of African leaders to meet the expectations of their subjects including the fulfilling of the basic needs (Ntalaja-Nsongola 1995). Soon after independence, the African leadership quickly embraced the culture of corruption, mismanagement of the continents resources, became insensitive to the Poor, embarked on elite privatisation of the state and subverted traditional values and institutions. In response, a new struggle for democracy and human rights was rekindled among the people resulting in the restructuring of political space to enhance pluralistic politics, re-establishment of new political values and a construction of new institutions (Ihonvbere 1999).

Kenya, like other countries on the continent could not insulate itself from this process. The struggle for the "second liberation" in the country just as is the case elsewhere on the continent became a struggle for pluralism, human rights,

accountability, popular participation in decision making and good governance (Ihonvbere 1999). It is important to note however, that the sustenance as well as the successful realisation of this effort will depend heavily on an enlightened citizenry that cherish the values of democracy and its capacity to contribute to the overall development of society. This is where education becomes a vital tool in guiding any meaningful change (Frazer 1999). Consequently, the school ought to be given its rightful place and role to help the masses appreciate the new political dispensation currently taking place in the country. Failure to do this only allows the people to go through such an important transition without realising it (Mbae 1994).

This paper examines the role of social studies in enhancing democracy in Kenya. Since training in citizenship is the major objective of this course, social studies no doubt is poised to play a pivotal role in imparting democratic ethos to the youth of this country. The paper further examines the objectives as stated in the syllabus as well as the treatment of topics that are relevant to democracy in some selected course books to establish the role that the new social studies curriculum is likely to play in laying a firm foundation for democracy in Kenya. Before this, the paper briefly examines the concepts of democracy and education as well as the process of democratisation in Kenya.

### **Democracy and Education: A Conceptual Framework**

Democracy as understood and applied in modern societies dates back to the ancient Athenian political practices in the 5<sup>th</sup> Century B.C. The concept democracy is derived from two Greek terms, *Demos* meaning people and *Kratos* meaning authority. Democracy therefore in its original sense was used to refer to people's authority or people's power (Were and Amutabi 2000). Ancient Athenians practised a direct form of democracy where eligible members of the state represented themselves in the assembly. Democracy in the modern sense refers to a variety of social and political systems (Gitonga 1987; Kaltsounis 1990). The representative model where individuals are elected as representatives of the people has emerged as the most dominant form of democracy. Critical values in democratic dispensation will include:-

- the sovereignty of the people where the masses have the right and the power to establish, control, change, and even abolish the government;
- individual human rights are guaranteed by institutional mechanisms capable of challenging patterns of illegitimate authority;
- the rule of law and respect of authority; and
- use of consensus to arrive at most decisions (Kaltsounis 1990).

The success of democracy as a viable political system requires a politically literate and active citizenry that take a direct and personal responsibility in the workings of society including government. These are people who are imbued with knowledge about the aim and purpose of government. How it is constituted, maintained and

renewed; how government policies are implemented; the nature and scope of government institutions, process and procedures and how they operate. The people should also possess the ability to translate the said political knowledge into political action (Sifuna 2000).

It is important to note that the acquisition of democratic culture cannot be left to chance. At the same time, this process just as is the case with general acquisition of cultural values is not genetically induced, inborn or inherited faculty. It has to be learned or acquired (Dawson, Prewitt, and Dawson 1977). The practice of democracy must therefore be taught to its practitioners as a first step in helping individuals and groups learn to recognise, accept and respect established social institutions and practices (Sifuna 2000).

Although a number of agents can facilitate the acquisition of democratic values, the formal education system or simply the school is perhaps the most important institution for political learning (Dawson, Prewitt and Dawson 1977; Keller 1980). This is because the political elite can easily direct the activities of the school to ensure that it moulds its clientele into the type of persons desired by society. "Educational institutions, unlike the many other agencies of socialisation to which the school children are exposed, are deliberately and explicitly designed to induct train and allocate individuals to roles essential to maintaining a society" (Koff and Vonder Muhll 1971 72, 73).

A major factor that has led to the prominence of the school in political learning has to do with the permanent impressions that it brings to bear on the future lives of the youth. Although some intervening factors are likely to affect attitudes that are acquired early in life as an individual grows and matures, early educational experiences have been shown to condition the learners' attitudes and role expectations and are therefore likely to affect their political behaviour (Langton 1969). These values are normally acquired between the ages of 4 and 13 years, which generally correspond to the elementary school years especially in the developing countries. It is therefore quite appropriate to target this age group for political socialisation because for most children in Africa, primary schooling is the only opportunity for developing one's life-long citizenship skills, because of the high school dropout at this level (ASESP 1994).

## **The Democratization Process in Kenya**

The struggle for political pluralism in Kenya and elsewhere on the African continent was caused by both the external as well as internal factors. First among the external forces is the collapse of the one party-communist governments in Eastern Europe forcing some vocal members of the clergy such as; the late Bishop Henry Okullu, the late Bishop Alexander Muge and the Rev. Timothy Njoya to warn the Moi government about the impending wind of change on the continent (Munene 2000). Secondly, the end of the Cold War following the collapse of the Union of the Soviet Socialist Republic (USSR) meant that African leaders could no

longer afford to play off one super power against the other. Consequently, western powers demanded the democratisation of African governance systems as a *sine qua non* for future bilateral relations and financial support (Munene 2000; Were and Amutabi 2000). Thirdly, multi-lateral lending agencies especially the World Bank and International Monetary Fund also followed suit. In addition to imposing fiscal policies on recipient countries, the donors also called for democratic practices in Africa before making any disbursements (Ihonvbere 1999). The Paris Club for instance withheld its aid to Kenya in 1991 thereby forcing the country's leadership to embrace political pluralism the same year (Munene 2000).

Internally, a serious push towards multi-party politics was occasioned by the *saba saba* riots that were staged in Nairobi and its environs on July 7, 1990 following the government's decision to ban a political rally, organised by political activists together with renegade politicians that had been expelled from the ruling party, Kenya African National Union (KANU), at the height of political intolerance in the country. Increased pressure on the government even in the face of a determined establishment to deal firmly with its opponents together with external factors mentioned above forced the government in 1991 to reluctantly repeal section 2 (A), a 1982 amendment to the Constitution which had made Kenya a *defacto* one party state (Munene 2000). This opened the way for more participation by political parties in Kenya.

It is important to note however that in their quest for a wider political participation, Kenyans have had to contend with major political setbacks that have occasionally threatened to derail the democratisation process, namely; the politically instigated ethnic clashes of the 1990s following the introduction of multi-party politics in the country (Munene 2000), political patronage as reflected in the establishment of numerous and ideologically bankrupt political parties that are mostly run along ethnic loyalties and personality cult, and last but not least, the constant party defections especially by political leaders due to lack of strong ideological convictions.

The setbacks identified above point to the fragile nature of democratic practise in Kenya. Whereas a number of reasons can be cited to explain the genesis of these problems, the lack of requisite political knowledge, skills and attitudes especially on the tenets of democracy and how the masses can participate effectively in the entire process is largely to blame (Kaltsounis 1990). To build and sustain a strong nation demands a competent and active citizenry. Unfortunately, the government of Kenya has in the past not given serious thought to the role of the school in the political education of its citizens as will be shown in the next section.

## **The Evolution of Social Studies Programme in Kenya**

The training of the youth for responsible citizenship has long been a major goal of education in many and diverse societies of the world (Remy n.d.). This is directly linked to one of the main objectives of education, which is, political socialisation, a mechanism through which society perpetuates its political culture. According to Dowson, Prewitt and Dowson (1977), political socialisation is simply a process by which all types of citizenship norms are acquired. In as much as most school subjects and activities have the potential of imparting political values to the youth, social studies as a course is specifically designed for this role. The primary objective of this course is to impart nation building skills to the learners to enable them become responsible citizens with basic mental and physical skills to influence the physical, political, economic, social and cultural development of the society (Ayot, 1986; ASESP 1994.).

The development of social studies as a subject that primarily aims at imparting citizenship skills can be viewed in four major phases:-

- traditional or pre-colonial citizenship education,
- colonial citizenship education,
- post-colonial citizenship education, and
- the post-1968 Mombasa Conference or social studies approach (ASESP 1994).

The Mombasa Conference (1968) is particularly important because it led to the official adoption of social studies in Africa. Preceded by two other conferences held at Massachusetts and Oxford in 1965 and 1967 respectively. The Mombasa Conference was called to discuss modalities of Social Studies Education in Africa (EDC and CREDO 1968). The Participants emphasised nation building content around relevant issues and topics that included democracy, good governance, environmental concerns, population, attention to attitudes, values, beliefs and problem solving skills. As a school subject, social studies was seen as a means by which African countries could prepare their respective citizens for effective participation in matters of development by taking into account their traditional histories, values and customs (ASESP 1994). The objectives of social studies as outlined by the conference are: -

- to create an awareness and an understanding of the evolving social and physical environment as a whole, its natural, man-made, cultural and spiritual resources, together with the rational use and conservation of these resources for development;
- to develop a capacity to learn and acquire skills, including not only the basic skills of listening, speaking, reading and writing, and of calculation, but also the skills of hand, together with the skills of observation, analysis and inference which are essential to the forming of sound judgment;

- to ensure the acquisition of that relevant knowledge which is an essential prerequisite to personal development as well as to a positive personal contribution to the betterment of mankind; and
- finally it is of utmost importance to develop a sympathetic appreciation of the diversity and inter-dependence of all members of the local community and of the wider national and international community (EDC and CREDO 1968).

In addition to stating the objectives of the course, participants also proposed an integrated approach in the teaching and learning of social studies as opposed to the traditional subjects of geography, history and civics (ASESP 1993). This was based on the fact that the purpose and content of these separate subjects were not relevant to the immediate needs of the African children and society. First, they compartmentalised knowledge and created artificial subject area restrictions that prevented children from understanding their environment better. Secondly, the subjects were found to be wanting in their methods of instruction which emphasised the acquisition of factual information through rote learning. By so doing the teacher took the centre stage instead of the learner. Thirdly, knowledge naturally exists as an entity, integrated whole and not as separate units. Accordingly, the teaching and learning of social studies through the integrated approach aims at presenting a broad area of knowledge which helps the learner to integrate learning experiences by cutting across the traditional subject matter boundaries and helps pupils to investigate into more areas of life and discover relationships easily (Shiundu 1980; Paige and Kerre 1994).

While some African countries quickly embraced the proposals adopted at the Mombasa Conference and started working towards integration in social studies, Kenya continued with the separate subject teaching. This followed the unwillingness on the part of senior officials in the Ministry of Education because of their traditional and conservative approach to the programme. The negative attitude on the part of education policy makers and problems in curriculum development did a lot in frustrating the efforts aimed at integration in social studies initiated in 1971 and 1979 respectively (Shiundu 1980; Ayot 1986). The government for instance suddenly adopted and implemented the integrated social studies programme in 1985 even before the piloting of the curriculum materials was completed. Interestingly, the subject which had been piloted under the name social studies since 1981 suddenly changed to geography, history and civics (GHC-combined), a further indication of the long resistance to the adoption of social studies in Kenya (Shiundu, 1988). It was not until 2002 that the course was appropriately renamed social studies and officially launched as part of the new primary school curriculum in 2003.

Apart from the problems that bedeviled the development of this subject as discussed above, previous social studies programmes failed in addressing themselves effectively to citizenship education in Kenya. Studies on the subject established glaring discrepancies between the stated objectives and the content on

one hand and the actual classroom practices on the other. On the whole, the subject did not go far enough in imparting the necessary skills in citizenship to the youth. Instead of tackling serious social, economic and political challenges that faced the country, the subject merely concentrated on the transmission of factual information for purposes of maintaining the status quo (Shiundu 1980; Haber 1989; ASEP 1993; Paige and Kerre 1994; Wanjohi et al,1998;Sifuna 2000).Such a situation could not be said to be ideal for nurturing political competence among the learners.

Sifuna (2000), for instance argues that, the lack of serious political considerations in education has ended up producing uncritical citizens incapable of appropriating the political dynamism in Kenya when he states: "Political socialisation in Kenya, therefore, takes the form of a conservative approach, which attempts to use political education to support, reinforce and legitimise the existing system of government and its policies. It tends to emphasize factual knowledge of the system and devalues discussion of controversial issues or the possibility of alternatives or reforms" (Sifuna 2000; 230).

The arguments advanced above point to one fact; that Kenya has not taken seriously the political education of her people in the past, a deliberate oversight given the government's policy on education since independence. For instance, the Kenya Education Commission Report of 1964 states clearly that, education should promote:-

- (a) national unity;
- (b) national development (both economic and social);
- (c) individual development and self fulfillment;
- (d) social equality;
- (e) respect and development of cultural heritage; and
- (f) international consciousness (Republic of Kenya, 1964).

These goals of education which have been restated in subsequent policy documents over the years "require an informed and competent citizenry if they are to be realised" (Paige and Kerre 1994; 28). However, the scanty and ineffective civics curriculum as analysed above could not help learners to appreciate the social, economic and political nature of government. This was further reinforced by the fallacy that had gained currency over the years that politics was a preserve of politicians (Bogonko 1980; Mbae 1994).

### **Social Studies and Democracy in Kenya**

Social studies was introduced by the Ministry of Education, Science and Technology as an integrated course of study in Kenyan primary schools in 2002 with a content that is very relevant to the changes that have taken place in the country since the advent of political pluralism. The course for instance aims at helping the learners to:-

- understand the structure and functions of the government of Kenya and demonstrate ability to participate in its operations;



- understand and appreciate the rights of individuals and responsibility to the attainment of social justice;
- identify, understand and respect own and other people's culture;
- recognise and understand the need for and importance of interdependence of people and nations;
- understand and show appreciation for the love for and loyalty to the nation;
- be willing and able to resolve disputes in and out of school; and
- understand and promote awareness and importance to democracy in society (KIE 2002).

These objectives clearly show a serious determination by the government to make a radical departure from the past with regard to political education. The new curriculum touches on some of the controversial political issues that have and are still taking place in Kenya for purposes of preparing its future citizens for an effective political engagement.

This section analyses examples of the material suggested in the social studies syllabus as well as the content on some of the topics relating to democracy as presented in some of the government approved course books to show the likely contribution or otherwise of the subject to the development of a democratic culture among the learners. Pupil's books for classes One, Five and Six published by Jomo-Kenyatta Foundation (JKF) and Macmillan (Kenya) Publishers will be examined.

Human rights and democracy are closely related and preparing learners to uphold these rights is very crucial in building a strong democracy. Hence the topic on the rights of the child in Standard One is important in laying the foundation for future study of other rights. The rights that are introduced to the learners at this level range from the most basic such as, play and friendship, to fundamental ones like; the right to primary education, parentage and the right against child labour among others. Children are however cautioned that the enjoyment of one's rights should not infringe on the freedom of others (Sanya, Nyaga, and Njuguna 2003).

Class rules are important in ensuring a smooth learning atmosphere by pupils. These rules are used to introduce children to the value of law and order for efficient running of society. The children also get introduced to political values through the teaching of the national anthem that is meant to instill elements of patriotism at this early stage.

Social relations and cultural activities, a topic for class five pupils examines relationships between schools and their communities. Among important issues for discussion is the role of the school in community development with pupils being encouraged to participate through: tree planting, charity walks to help the needy, cleaning the environment as well as activities like drama, that create awareness to the community like drama. Such a relationship with the school community is likely

to develop positive attitudes among the learners with regard to community service (JKF 2003b).

On politics, the authors try to analyse some important post-independent political developments in Kenya like; the introduction of one party state, the 1982 coup attempt, the controversial queue voting method introduced in 1988, the saba saba riots of 1990, the repeal of section 2 (A) of the Constitution in 1991, some of the registered political parties and multi-party elections (JKF 2003b; Sanya and Njuguna 2003a). Standard Six pupils learn about political developments in East Africa where for instance, the movement system in Uganda is discussed and then contrasted with that of Kenya (Muchoki, Anyika, and Muthee 2003; Sanya and Njuguna 2003b). This approach is quite relevant in helping pupils to appreciate political systems of other countries based on their unique circumstances.

The formation of good citizens is the core of social studies (ASESP 1994). Consequently, a topic on citizenship in Standard Five examines different types of citizenship and how they are acquired. This is followed in Standard Six where the rights of a citizen are identified. These include; determining the leadership of one's country by participating in elections, criticising bad governance and participating in civic life by forming civic societies for purposes of developing the nation.

A topic on democracy and human rights starts by explaining the concept of democracy through such terms like; direct and representative democracy, parliamentary and presidential systems of governance, delegative and liberal systems and the importance of democratic practices. The authors point out that, in all these cases, the will of the people should determine the kind of governance to be adopted by the society (JKF 2003b; Sanya and Njuguna 2003a). Pupils in Standard Six learn to classify human rights and explain their importance to society. The bill of rights as presented in Chapter Five of the Constitution is highlighted. Of critical importance to democratic education is the emphasis on the importance of respecting human rights in society since it is meant to promote democracy, protect life and property as well as enhance tolerance among others. In addition, different ways through which human rights can be abused are explained (Muchoki, Anyika, and Muthee 2003).

Discussions on law, peace and reconciliation, start by explaining the importance of law and order in Standard Five as well as factors that undermine the same. These include; tribalism and nepotism, denial of basic rights like free assembly, rigging of elections, and the use of excessive force by police, poverty, poor leadership and corrupt practices such as land grabbing. (Muchoki, Anyika, and Muthee 2003), go further to list the effects of lawlessness which at times lead to the displacement of people. However, rather than illustrate such scenarios with a picture of rioting university students, the authors should have used pictures of people displaced during the many ethnic clashes experienced in the country following the advent of political Dluralism in 1991. These would make more sense to the learners since

some might be victims of the said atrocities than university activities that seem a bit remote to primary school pupils.

The importance of peace to society is emphasised in Standard Six. This can be realised by respecting the constitution, being honest and patriotic. Factors that undermine peace are like:- corruption, lack of fairness, poverty due to unequal distribution of resources and land or unequal development, abuse of power by those in authority and oppression by dictators are also identified (Sanya and Njuguna 2003b; Muchoki, Anyika, and Muthee 2003).

The authors are categorical that free expression which is very important in a democracy should to be nurtured right from the school and that its denial could have contributed a lot to student riots in the past as a way of expressing opposition to oppressive school administrative practices (Muchoki, Anyika, and Muthee 2003). Free expression among students makes them learn to defend their rights in future. This approach should be very much encouraged in the modern age since schools in Africa were accused in the past for practising authoritarian tendencies towards learners, a factor that did a lot in encouraging docile behaviour among members of their respective societies (Mbae 2000; Sifuna 1994).

### **Future Challenges and Implications**

A good curriculum like the one analysed in this paper does not guarantee democratic processes in any society including Kenya. A major challenge to the education sector as a critical player in the democratisation process therefore, heavily depends on the careful implementation of the same to enable the country benefit from the on-going reforms. The success of the school in this endeavour will however depend on some factors as discussed below.

First, social studies teachers have to make adjustments to meet the demands of the subject. A re-orientation from the previous GHC-combined especially with regard to the political content in the course is quite crucial for effective implementation. Accordingly, changes in both the pre-service and in-service teacher training programmes are very vital to avoid some of the mistakes that occurred in the past with regard to curriculum reforms (Shiundu and Muhammed 1996). Similar changes should target social studies teacher trainers. This is quite urgent especially when they have to induct these teachers in the integrated approach when they themselves were trained in separate subjects at the university (Paige and Kerre 1994; Shiundu and Mohammed 1996).

The success of the new curriculum will also rely heavily on major changes in instructional procedures. Teaching methods in social studies have to be wide and varied. They have to go beyond the usual lectures and rote memorisation of facts by pupils and incorporate methods which aim at imparting values that are necessary in a democracy. Activity methods such as; class discussions, group work, problem-solving and class debates about social and controversial issues

especially those highlighted by the media ought to take centre stage in the teaching/learning process. Furthermore, pupils will have to get involved in service learning programmes and field trips among others (ASESP 1993; Paige and Kerre 1994).

Teachers will also have to re-examine how they relate to their pupils. The classroom will only become effective in instilling democratic principles if teachers show the willingness to discard authoritarian behaviour and start to embrace dialogue with their learners (Freire 1996). Teaching and learning in social studies demand that the learner be the focus of class instruction. Accordingly, teacher centred methods will have to be abandoned. In addition, learners will have to be presented with opportunities that will help them practise skills in citizenship. It will therefore be the role of teachers to introduce their pupils to important values of responsibility, accountability, transparency, participation and conflict resolution using more interactive methods that encourage initiative on the part of the learners than teachers "depositing" facts in the heads of the learners (Freire 1996).

Learning about democracy should not be confined within the classroom but should permeate the whole school. Accordingly, many and relevant opportunities will have to be availed to pupils to enable them learn and practise democratic values while in school. For instance, teachers have to start involving learners in the administrative activities of their schools as a way of helping them internalise basic values of responsibility and participation early in life. This can only be realised if the authoritarian behaviour, common among school administrators is abandoned. Pupils can participate in the running of schools by for instance; allowing them to form school councils, electing prefects, expressing themselves freely as well as involving them in seeking solutions to problems whenever they arise among others (Mbae 1994; Sifuna 2000).

A most likely setback to these efforts may lie in the country's examination system. Coming at a time when passing of examinations and certification seem to be the hallmark of the education process, radical changes in the way educational activities are perceived and conducted will be necessary for social studies to meet its objective. For example, the setting of examinations will have to be reviewed to avoid test items that demand comprehension and recall of factual information from pupils. Instead, examination questions should emphasise more on the acquisition of social skills and values by the learners. Pupils should also be tested in attitudes, inquiry and problem-solving abilities among others (Paige and Kerre 1994; Shiundu and Mohammed 1996).

Enhancing democracy in Kenya through the school will benefit greatly from the democratisation process in the wider society. This will provide the much needed congruence between what pupils learn in school and what society practices. Pupils will therefore benefit in an environment where all organisations and institutions fight from the grassroots up to the national level uphold democratic values. In addition, members of society ought to start nurturing values of tolerance

accountability, transparency and the respect of human rights as a way of providing good role models to school pupils. There is also the need to strengthen civil organisations as a way of enabling the masses participate in the governance of their society. Such measures are likely to strengthen the role of the school in imparting democratic ethos to the youth.

The success of democracy as outlined already heavily depends on an enlightened citizenry. The import of this is for Kenya to intensify its educational activities for purposes of helping its people attain awareness about themselves and their society. The "free primary education" initiative introduced in the country in 2003 for instance is a step in the right direction as it aims at introducing basic literacy skills to all, a very vital tool in the sustenance of any democratic system. It is also important to continue with education on democracy at secondary and tertiary levels either through specific courses or by integrating elements of democracy in other subjects. At the same time, mechanisms should be put in place, for instance by human rights groups and other interested parties to step up awareness campaigns especially for those out of school as a way of helping them gain basic democratic principles. These efforts will no doubt enable many Kenyans come to appreciate democratic values which are likely to play an important role in stimulating the country's development agenda in the 21<sup>st</sup> century.

## **Conclusion**

This paper has examined the role of social studies in the primary school curriculum in enhancing democracy in Kenya. Unlike in the past, Kenya seems to be taking the political education of its citizens seriously. The extensive coverage of issues that are central to democracy and the democratisation process in this subject is meant to help primary school pupils appreciate the new political dispensation in their lives. Although, the introduction of this subject in the primary school curriculum is a noble one, it is important to note that the mere teaching of social studies does not automatically lead to a democratic society but only forms the beginning of a crucial long journey whose success will largely depend on the goodwill and support of all Kenyans. On their part, educational institutions have to prepare for radical changes in order to remain relevant in the on-going political dispensation. Schools for example have to depart from their current norms with regard to instructional as well as administrative procedures for social studies to realise its goal of imparting democratic ethos to the youth of this country.

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## CHAPTER 6

# **THEORETICAL APPROACHES TO LITERARY CRITICISM, THEIR APPLICATION AND PEDAGOGICAL IMPLICATIONS: A Critique of Ngugi wa Thiong'o's A Grain of Wheat**

*Ng'ong'ah "Billy" George*

### **Abstract**

The study of literary texts has, for a long time, formed an important aspect of language education programs the world over. It also plays a vital part in social and cultural grooming and pleasure. However, in Kenya at the moment, concerns have been expressed in the local media by the stakeholders concerned that the school system, both at secondary and university level, has not given Literature Education the due attention it deserves. A number of shortcomings have been cited. These have included, among others, poor mastery of literary theory by teachers, lack of a thorough and effective regime in literature education, use of inappropriate methods of teaching and inadequate reading resources. These shortcomings have encouraged teachers of literature to seek shortcuts, the most glaring of which has been the over reliance on set book critiques at secondary school level. The consequence has been a near total avoidance of meaningful interaction with the literary text itself. This situation results in the defeat of the central objective of literature education - training the learner in the art of independent critical reading, comprehension, analysis, interpretation and response to literary texts, which the guide books should not replace. This paper outlines the ideal in terms of literary reading. It defines the term literary theory, describes the five broad approaches to literary criticism, and explains their pedagogical implications. It goes further to demonstrate the path critical reading and response that literary texts ought to take while using the sociological approach purely for illustration, on Ngugi's *A Grain of Wheat*. The paper recommends that the reading, analysis, and interpretation demonstrated herein is the ideal one regardless of the theoretical premise that informs the reading.

### **Introduction**

Literature education is important for a variety of reasons. A few among others are the learner's language development (Roger 1983; Ramsaran 1983; Widdowson 1983.1987; Trengrove 1983), socialisation (Moody 1983), cultural education (Richards. 1986) and communication (Barthes 1967, cited in Moody 1983). It is for



these reasons that literature education has been vital in many systems of education the world over. Literary appreciation or criticism; the reading and response to works of literature is the central component of literature education (Rice and Waugh 1998). Literary appreciation is basically ideological in the sense that the reading and response to literary texts is guided by the doctrines, or ways of thinking of certain individuals in the society, or the body of ideas on which a social system is based Little (1973) and Eagleton (1983:14) view ideology as "...the way in which what we say and believe connects with the power structure and power relations of the society we live in."

Literary criticism is a controversial field. Sometimes the boundary between a theory and an approach is blurred, but the fact that theory provides the basis for reading and response to texts, is agreeable with all critics. Literary theory can be viewed as the principles, ideas, or opinions upon which the production and reading of literary texts can be based (Welleck and Warren 1986). Literary theory, production and reading are closely intertwined. However, in recent times it has been observed that the majority of newly graduated teachers of literature do not demonstrate in their practice, knowledge and mastery of literary theory (Ngongah 2002).

### **Importance of Knowledge of Theory**

Mastery and application of theory is crucial to the teacher of literature for a variety of reasons: Theory is the basis of any reading and response to literary texts. Conscious mastery of the theories allows for a thorough and objective reading, analysis and response to the texts selected. Theory influences text selection and **guides articulation** of learning objectives. Knowledge of theory influences teaching methods **and** conduces to an understanding of the premises of any criticism of the texts selected.

### **Approaches to Literary Criticism**

Scott (1979) outlines five broad approaches: The sociological, the psychological, the formalistic, the moral and the archetypal. Under each broad approach can be placed the theories that reflect the basic premises of that approach.

#### ***The "Sociological" Approach***

This approach originates from the field of sociology which Goldthorpe (1988:3) defines as "...an organised endeavour to increase human self-knowledge and self-understanding through the systematic study of social life."

Sociological theorists argue quite correctly that literary art is a creation of society. The society existing in time and space produces the author and nurtures him. Through nurture, the society provides the artist with all the social data he or she

needs to exercise his or her imagination on. The literary work therefore will mirror the society not only as the artist sees it, but also as (s)he wishes to see it. The relationship between the text and the social atmosphere is viewed as reciprocal. The theories that would fall under this approach include the Marxist, the Negritudist, and the Gender/ Feminist. How the society is structured, organised, and managed will be the focus of the reading, analysis and response to the literary text.

### ***The "Psychological" Approach***

Psychological criticism is drawn from the field of psychology and is based on Freud's theory that all forms of language reveal deep seated emotional influences. The literary text is viewed as a reflection of the author's fears and unfulfilled dreams. The reader, consequently, is faced with the challenge of discovering, through his or her reading, the factors that motivated the author to write. This will normally be done by studying the characters the author has created, how (s) he uses them, and how (s)he intrudes.

### ***The "Formalistic" Approach***

**The theories under this approach** tend to try to **establish whether** or not the **literary artists** work can lay claim to merit as truly a work of creativity. The reading will examine **the** genre, chapters, acts, scenes, episodes, paragraphs, and stanzas in the **case** of poetry, sentences, clauses, phrases and even words. Formalistic theorists **will** consider how these have been arranged to create beauty of expression. Under **this** approach are theories such as Russian formalism, Aesthetic, Deconstructionism, and Existentialism.

### ***The Moral Approach***

This is based on religion approach to literary appreciation (Reese, 1980), and assesses literary texts from a moral or ethical perspective. Moral critics argue that literature should make the society better and should be viewed from the morality of what it says. The cardinal principle of this theoretical approach is that man is different from the other animals by his reason and possession of ethical standards. Through the study of literary texts human beings should purge their emotions and control their animalistic tendencies. The moral artist will attack such vices as eccentric individualism which is one of the root causes of the numerous social conflicts that plague the world today. In this regard, the moral critics strike a common cord with the sociological critics.

### ***The Archetypal Approach***

This approach recognises that each of the four approaches above standing alone does not suffice in appreciation of any work of art, but that since each is important in its own way they must all be relied on in the criticism of works of art. Therefore the archetypal is an integration of the four major approaches already mentioned. Readers using this approach will consider the genre of the work, the themes, and will seek to discover whether the work falls under the wider domain of literature. They will try to find out whether the work will stand the test of time and compare favourably with the classics.

Comparative literary discourse, which, according to Spiro (1992), is a model of literary education in its own right, is based on this approach. Proponents of this approach recognise the fact that there are certain universal themes in literature, whatever the time and place. Such themes include among others: superstition, love, mystery, violence, fear, deprivation, death, greed, corruption. The argument is that meanings and messages transcend the single work to a whole body of literary works, and so one of the aims of literary works is to prove that in reality the characters depicted in literary texts are indeed archetypes of those alive with us today, and so literature and literary criticism seeks to restore universal humanity.

### **Pedagogical Implications**

For the teacher of literature it is imperative that (s)he be conversant with all the major theoretical approaches to literary criticism and also the theories that fall under them. The teacher must strive to understand the society that produced the author of the work. (S)he must not only understand how the work relates to the society but also the people portrayed in terms of culture, religion, economic, social and religious organisation, hopes and aspirations among others; the dynamics of all these, and how they affect individuals.

The literature teacher must be a keen and avid reader. His/her reading, comprehension, analytical, interpretative and response skills must be beyond doubt. The teacher must be able to understand the author's intention(s), and how these are expressed through the characters in the text. He/she must be able to account for actions of the characters in the text, and then lead the learner to discover what he/she had discovered, or to discover even more.

The teacher must be aware of the relationship between the moral codes expressed in the work of art, and the moral codes of the society in which he/she is teaching. This awareness will enable the teacher to choose for consumption of the students those literary texts that meet the society's moral aspirations. He/she must understand and see the relationship between the complexes that motivate not only

the individuals portrayed, but also the wider society, and identify the morals to be drawn there from.

The literature teacher must have a keen sense of beauty. He/she must be able to discern literary beauty where it exists even in slightest streaks. He/she should be able to unravel the sequence of events where the author has complicated them in the attempt at artistry and guide and give adequate practice to the students to do the same, using a wide variety of literary texts. This is necessary in order to arrive at the logical and comprehensive meaning of the text. He/she should give praise for skillful craftsmanship where praise is due, and chastise for mediocrity or unnecessary and impeding complexity where these exist.

Finally the teacher of literature must have stamina to consume more literature (and even produce literature him/herself) if he/she is to continue to be conversant with universal patterns and themes in literature. Once the teacher has thoroughly read a literary text and combed it in the light of all the relevant theories of literary criticism, he/she must then consider the most effective method, or combination of methods by which the learners can be led to discover for themselves the meanings and experiences depicted in the literary texts (Rousenblatt, 1979). This can be best done through broad general questions that compel the learners to read the entire text. Specific probing questions that require specific responses should also be used. Group discussions and pair work, class discussions and individual work should be organised to develop learners' response skills. The questions should not only require the recall of facts, but also, and to a large extent, the interpretation of events and issues. The teacher can also involve the groups in the dramatic rendition of important scenes. The student should be encouraged to read the literary text intensively as many times as possible with a keen mind, in order to discover as much information from the text as possible. The teacher should also encourage the learners not only to read other texts by the same author, but also texts by other authors treating similar issues. The teaching method used should move from known to unknown, the simple to the complex (concrete to abstract), in order to develop literary knowledge and skills progressively.

### **Critique of a *Grain of Wheat* using the Sociological Approach**

This critique is an application of the sociological approach to literary criticism on the text. For convenience, this critique will only examine the social aspects of the novel. This is not to say that the sociological approach is the best, or the ideal for the close reading of all texts. It is used here only for the purpose of demonstration. Other approaches can be used to analyse other textual data within this same text. Indeed the choice of a theoretical framework for the reading of any literary text depends largely on the text itself. The critique will divide the novel into three periods; before colonisation, during colonisation, and just before independence and after.

*C'I tclp'qHY j gcv* is set in Kenya, among the Gikuyu, and specifically the action is around the villages of Thabai, Rungei, and Githiri forest station. Ngugi describes, though not chronologically and in detail, the Gikuyu community before the coming of the white man, the conflict between the white man and the Gikuyu community, and how the mood of the characters is affected by the coming of "uhuru". The novel spans four days just before December 12, 1963, and it can be observed generally that although the Africans viewed the coming of political independence with hope, the white characters viewed it with trepidation and even with frustration and disappointment. Although the novel spans four days just before "uhuru", through flashbacks Ngugi traces the struggle for independence right back to 1920's when Henry Thuku formed one of the first political parties in Kenya.

### **The Gikuyu Community before the Coming of the Europeans**

Ngugi depicts the Gikuyu community during this period as fragmented. Each village formed a political unit, and these had a council of elders who **"settled disputes"** (p. 65) among members of the same village. Conflicts between villages were sometimes settled violently. These were the days of inter-village and inter-tribal rivalry and wrangling. The days of warrior-farmers like Mbugua, Kihika's father. These were the days when the Gikuyu community cherished and respected physical power and warrior-hood, a tradition carried forward to the days of the white man. They were the days **"before the white man ended tribal wars"** (p. 66). These were the days of traditional prophets, the most famous of whom was Mugo wa Kibiro. Ngugi presents his society during those days as a permissive community where men fought for women and women fought for men: *"Thabai y cu'lxo qwu'dgecwag'b gp'lt qo 'ij gtg'lwegudwnt'lwij v'qij gt'lt qwr u'lpf'iqqnl' cy c{'ij gl'y qo gpOI knu'lxgf'b gp'lt qo 'Vj cdck'lp{y c{.'lq'ij cv'tcnpi 'ij go "* *ecr'lxg'y cu'p qv'gz.cen' b'f'hllewn'lgcv' \$'r'85-0*

This tradition was carried on to the days of the rule of the white man, and it is perhaps for the reason of sexual license, that the society accepted polygamy. Waruhiu, Gikonyo's father was a polygamist (p. 64) and even Karanja's father (p. 194). Children, in this community, were considered to belong to the mother. It is for this reason that when Waruhiu discovered that Wangari's thighs **"did not yield warmth anymore"** he sent her away together with her son Gikonyo. Similarly, Karanja grew up into a man entirely under the care of Wairimu his mother. Both characters can be considered typical sons of women. Even Mugo, the main character, grew up under the care of his aunt. Karanja is not allowed to see his child. The main players in this novel are from dislocated dysfunctional families, and this may be due to the fact that this society considered children as belonging to the women. Family foundations are weak and that is why broken marriages, and single parents are central features of family life.

By the time the British came to establish their rule in the late 1800s, the Gikuyu community is depicted as having serious inherent structural weaknesses.

## The Period of Colonisation

The period of colonisation is depicted as one of racial violence and conflict, deeply rooted in economic reasons. This period saw a marked transformation in the social set up of the Gikuyu society. In the first place there was the advent and establishment of Christianity and Western education, changes which the Gikuyu community embraced wholeheartedly. This can be evidenced by the people's general knowledge of the bible, their ability to quote or refer to the bible to justify acts of rebellion against colonisation, and their desire to take their children to school. The coming of Christianity was followed by the establishment of the colonial administrative system over large areas, embracing several villages, ridges, and indeed tribes.

The colonial administrative structure comprised of the Governor, Regional Administrators: Provincial Commissioners, District Commissioners, District Officers and chiefs, who, since they did not exist in the traditional setting, had to be created. The colonial social organisation was one that inevitably created classes with Europeans at the top, the Asians in the middle, and the Africans at the bottom of the social strata. It was an exploitative social set up that encouraged British theft of African property, especially land. This stratification not only created new social **conflicts but also a new class of Africans condemned to working on European farms** - the squatters. Waruhiu, Gikonyo's father, and Muhoya are examples. The European policy of forceful acquisition of African land was a perfect recipe for social conflict. At first the demonstrations against such acts of theft and exploitation were peaceful, especially after the formation of political parties. The first party formed by Harry Thuku took upon itself the task of pressing for unity **and** village conflicts were forgotten. There seemed to grow a new sense of African solidarity, an off-shoot of which was the formation of independent African Churches.

The growing momentum of African dissent naturally displeased the colonisers who resorted to force to clamp down on any form of its expression. The 1923 peaceful procession led by Harry Thuku was violently dispersed (p. 14). In 1952, "... Jomo Kenyatta and other leaders of the party were arrested ..." (p 13). The effect of this colonial violence was to drive African resistance underground, and we see the formation of armed but uncoordinated bands of fighters known as Mau Mau. This was the movement Kihika joined. Apparently, he had formed his own group and was joined by the ex-World War II veterans like Muhoya and Kainandu, and other villagers. This group fought the colonial forces in and around Rungei and Thabai. The result was that it succeeded in drawing the wrath of the colonial forces onto its own people. The villagers were herded into newly built, barricaded and guarded villages, while all the able-bodied men, except those who denounced the Mau Mau and their oath of allegiance, and collaborated with colonisers, for example Karanja and later Gikonyo, were detained in special camps set up for that purpose. These efforts were meant to break the body and the spirit of African resistance. Those who **were** lucky to leave the camps alive such as Gikonyo and Mugo, recount the

horrors that attended their stay there. Although the Mau Mau lost the armed conflict, heroes were created, real and imagined, and with them stories of exploit sometimes carried to the peak of imagination. One such hero created is the main character Mugo.

The colonial violence and its African reciprocation, coupled with economic inequalities sowed the seed of racial discord and aggravated class difference even among Africans. The District Officer John Thompson disbelieves Mugo simply because Mugo is an African. Even when the information Mugo gives him about Kihika is finally proved true, he does not release Mugo from detention. Neither is Mugo given the promised reward money. When an Asian girl screamed after being molested by some African boys, the boys are immediately accused of having raped her. Colonialism created capitalism, or at least carried it to new heights. On his release from detention Gikonyo rises from rags to riches by ruthlessly exploiting both his family and the villagers. Such ruthless exploitation by the able of the disabled continues to flourish in Kenya today. At the family level during this period, we see an increased level of destruction of family relationships, partly due to the emergency restrictions and partly because of human selfishness. Waruhiu sends Wangari and young Gikonyo away ostensibly because Wangari's thighs could not yield him the warmth he desired anymore. Gikonyo is torn from Mumbi's arms and dragged away to detention by the emergency rules.

As the 12<sup>th</sup> of December 1963 draws near, the Mau Mau war has long been lost, but Kenya has successfully fought colonialism politically, and has been granted internal self-government. Some, like Karanja, Burton, and the Thompsons, face the problem of social and psychological adjustment while others, like the Member of Parliament, seem to have adjusted easily.

### **The Last Four Days Prior to 12<sup>th</sup> December 1963 and Immediately After**

The social and economic disparities created by colonialism are firmly entrenched, and so have the seeds of future social injustice and conflicts been sowed. In this respect, *A Grain of Wheat* is a very prophetic novel. Although the country is about to gain political independence, the stage is set for neo-colonialism and the attendant capitalistic exploitation of the many by the few. The Indians and Europeans still control the economic and social life of Nairobi (p. 54). Ngugi gives the contrast: "The Africans only came to sweep the street, drive the buses, shop and then go home to the outskirts before night-fall "(p. 54).

The European and Asian businessmen are still given preferential treatment by the police and city council askaris who harass and intimidate the African businessman, a practise that continues to this day, and which has led to frequent loss of life, limb and livelihoods. Although political leadership will change with independence,

socially and economically nothing will change, or changes will be for the worse. The Member of Parliament is a polished liar, and it can be seen that the culture of deceit by politicians has already taken root. To date they still are prolific liars. In him can be seen a black colonialist. The reader can see an unjust society where the poor jobless are still arrested for failure to pay the poll tax. An already corrupt society where African market traders and transport businessmen have to bribe the police before they are allowed to conduct business has been firmly established.

Finally, when the champions of the independence struggle, real and imagined are critically assessed, we find that, apart from Kihika, most of them lack substance and credibility. This can be due to the fact that they are all from broken families, and joined the Mau (or the government) not for the love of their country but in selfish desperation. Gikonyo, Muhoya, Mugo, Koinandu, Karanja and others were all social misfits who could not be relied upon to bear any social responsibility. Those who joined Mau Mau as depicted in the novel were, in most cases, criminals and social outcasts (for example Muhoya and Koinandu) who joined to save their skins, and could not be relied on to give the national independence and the revolution the direction it deserved. Perhaps, it is Ngugi's contention that after all, the ordinary man as presented in the novel could not be trusted to give the revolution a direction, because socially they themselves lacked direction. Consequently, an opportunity or vacuum existed that allowed the independence **struggle to be hijacked by the colonial lackeys - men who contributed nothing to** the struggle or indeed worked hard to hamper it. The novel ends in a pessimistic note with the main characters doing the best they could to put up with the status quo. People did not understand the relationship between the triumphant political party Kenya African National Union (KANU) and their mass movement - the Mau Mau, and indeed there was none. They hoped Kenyatta embodied their own hopes but this was a misconception - hence the pessimism with which the novel ends.

### **The Female Question**

Another theory under sociological approach to literary criticism is Gender or (Feminist) theory. This line of critical thought examines and critically assesses the relationship between the male and the female members of the society as may be revealed in the text.

In *A Grain of Wheat*, Ngugi portrays women as contributing to social development even more than the men. He portrays the women as more humane, stronger spiritually, and more stable emotionally than the men. For these reasons the men rely heavily on the women for emotional stability. The interpretation that the women have to be stronger in this social context because they have been abandoned to carry out the entire responsibilities of parenting cannot be misplaced.

In the first place the Kikuyu woman is represented as having been saddled by the men folk not only with the responsibility of carrying and bearing children, but also that of bringing them up. Wangari struggles to bring up Gikonyo and instills ethics



in him. So does Wairimu to raise Karanja, though she does not succeed. She is against Karanja's joining the home guards because she considered it a betrayal of the African cause. She chastises him for laziness in his youth and threatens to burn or break his guitar. Wanjiku, Mumbi's mother, trained her daughter Mumbi to become humane and emotionally mature by ordering her during her youth, to give food to visitors. When Mumbi's marriage becomes sour and she thinks of divorcing Gikonyo, it is Wanjiku who rebukes her against it and prevails upon her to continue visiting the sick Gikonyo, asserting that it is inhuman to desert a dying man.

Women are also portrayed as having played an important role in the struggle for independence. Wambui conveyed arms and information to forest fighters. Her fighting spirit for the independence movement never died, and she takes part in organising the Uhuru Day. Njeri is presented as a masculine woman who joins Kihika in the forest. Men called her a cat because she could fight them, and few could impose their will on her. When Mugo refuses to lead the Independence Day Celebrations, it is the women who send Mumbi to persuade him, and Mumbi agrees to do so. Women also helped Gikonyo in his business enterprise by selling produce.

Women are presented as being mature and more emotionally cultured than the men. Mumbi has learnt to control her emotions and desires. Most men in the novel have not. She learns from Mugo himself, that he had betrayed Kihika her brother. Despite the fact that she learns of it in the process of being brutalised by him, she tells no one of it. Mumbi liberates Gikonyo from his inadequacy complex thus enabling him to seduce her successfully. He had feared that since Mumbi had rejected Richard despite his education, he, a mere carpenter would not succeed. Although Gikonyo misunderstands her, Mumbi is a woman of ethics. She rejects Richard despite his education, puts off Karanja for having scandalised her and sticks to Gikonyo even in his sickness. Though they are estranged, she tries to console Gikonyo and helps him to come to terms with himself. It is she who reveals Mugo's confession to him and in so doing Gikonyo comes to realise that after all he, too, is not morally clean enough to judge Mumbi. He is then willing to talk about the illegitimate child and to reconcile.

Dr. Lynd is presented as humane. She offers Koinandu a job when he is destitute. It is the brutalisation at the hands of Koinandu and his gang that makes her anti-African. It is the women, or the thought of them that inspires the men to stay sane in the brutalising effects of detention. Mumbi and Wangari give Gikonyo hope. When he confesses or denounces the oath, it is in order to see them. Women bring reconciliation. It is Wangari who pacifies Gikonyo when he learns that Mumbi's child belongs to Karanja. Although Karanja brutalised and scandalised Mumbi, he warns him not to attend the celebrations because the ex-Mau Mau plan to kill him. Although Mugo was responsible for her brother's capture and consequent death, she does not wish him to be killed in revenge. She feels nothing can be gained from revenge.

## **The Social Issues (Themes)**

in *A Grain of Wheat*, Ngugi examines a number of social issues. These include Betrayal, Guilt and Fear, Colonialism, Love, Fate and Reconciliation

### **Betrayal**

In a way, *A Grain of Wheat* can be considered a detective story. The chief investigator in this case is Muhoya, also known as General Russia (R) assisted by Lt. Koinandu. One question which has plagued the former Mau Mau fighters is "Who betrayed Kihika to the forces of colonialism?" General R. is determined to clear this issue, and for this reason he tries to find out from Mugo who Kihika was scheduled to meet on the day he was betrayed.

Betrayal can be examined at two levels - the social and the personal. At the personal level Kihika is betrayed by Mugo to the colonial forces and he is hanged. Karanja and the home guards betray the struggle by their society to be free by joining the colonial forces. Mumbi betrays Gikonyo by letting Karanja take advantage of her. Koinandu betrays Dr. Lynd and conspires in her brutalisation and rape despite the fact that she gave him a job when he was destitute. Margery Thompson betrays her husband by having an affair with Dr van Dyke. John Thompson **betrays his wife by not giving her enough love, and this makes her to be** tempted into an affair with van Dyke. He also betrays the trust bestowed upon him by his government by visiting extreme acts of violence on the detainees at Rira camp, where eleven inmates died. He in turn feels betrayed by the British government because he had wasted a good part of his life in dedication to the colonial cause, which his government now seemed bent on abandoning. Kihika also betrays Wambugu by abandoning her for the Mau Mau despite the fact that she sincerely loved him. General R. betrays filial responsibility by fighting his father. At the social level those who confess the oath, people like Gikonyo and Karanja betray the struggle and in effect their society.

### **Guilt and Fear**

These two themes are closely connected and are also related to betrayal. Most of the characters are plagued with guilt and fear. The novel opens with Mugo's nightmare. In him, the twin themes are most explicit. He is uneasy, confused, sometimes absent-minded, and at times neurotic. This state of mind can be traced back to his youth. He grows up under the charge of his drunken repulsive and irresponsible aunt Waitherero, who physically mistreated him. For this reason he had even wished to kill her. He had never been given a chance to assume important responsibilities on his own. When Waitherero dies, Mugo finds himself free to prove his worth to the world through hard work and material success. This is the dream Kihika had wanted to destroy by recruiting him to lead the Mau Mau movement in Ihabai. Due to fear, he betrays Kihika. Not only does he fear for his

plans but fears also for his life. He cannot decline Kihika's request, because he fears Kihika will kill him. Yet if he joined the Mau Mau, the colonial forces would kill him. He is in a dilemma. Ironically, betraying Kihika brings him more trouble than relief. Thompson jails him. He does not get the prize money placed on Kihika's head. And when he is released from detention, he is not only plagued by guilt for the betrayal but also fear of retribution because he knows that General **R.** is out to get the betrayer and avenge the death of Kihika.

Karanja is another character plagued with fear and guilt. He joins the home guards in order to save himself from detention, and consequently he feels guilty for having betrayed the society and develops a fear for its members. His mother Wairimu constantly reminded him of it. One of the reasons he joined the home guards was to be near Mumbi because he had never reconciled himself to the fact that he had lost her to Gikonyo. He knows that lawfully Mumbi is Gikonyo's wife. Yet he desires her. He tries to seduce her, but she would not succumb. When the news of Gikonyo's release reaches him, he fears he will never succeed. Indeed when he gets the chance of having carnal knowledge of her, it is in circumstances that can best be described as rape. This hollow victory gives him no pleasure and he feels guilty. The rape of Mumbi by Karanja plagues him with guilt, and the child conceived therefore is a constant reminder to her, of the humiliation by Karanja.

Magery Thompson feels guilty about her affair with Dr. Van Dyke and she fears the possibility of her husband's discovery of that affair. John Thompson himself feels guilty of the Rira incident in which eleven inmates were killed. He fears the enquiry that would have followed, especially now that independence is coming, if conducted under the black government it would be fateful for him.

Gikonyo suffers inferiority complex. He would like to declare his love for Mumbi but he fears. It is she who gives him confidence finally to do so. Confessing the oath makes him feel guilty. When he is released he goes home to his wife only to find her with Karanja's child and he is psychologically shattered. It is Mumbi's faith and patience coupled with Mugo's confession that pacifies his spirit. But even then he feels guilty for his inhumane treatment of Mumbi. Muhoya, alias General R is also plagued with fear and guilt. He cannot go back to Nyeri whence he came because of having fought his father. Although he exudes an air of toughness he has had his own spells of fear and guilt. He leads the gang that kills Rev. Jackson Kigundu and he discovers that Rev. Kigundu resembled his father. Muhoya forces all members of his gang to participate in the killing in order to share the guilt. Lt. Koinandu is plagued by guilt because he had conspired in the rape of Dr. Lynd, an old woman who offered him food, shelter and work when he was destitute. When he meets her again at the forest station just before Uhuru Day, he is struck with fear of arrest for the rape. Dr. Van Dyke who was born in South Africa and had worked in Rhodesia and Kenya is haunted by things he cannot understand.

## **Colonialism**

*A Grain of Wheat* depicts Kenya under British colonialism. The relationship between the white characters and black ones is that of conqueror and the conquered. The African struggle for freedom is led by people like Harry Thuku and Jomo Kenyatta. The Mau Mau war is part of this general struggle. The colonial government responds to the African desire for political independence by detaining Africans in concentration camps, jailing suspected Mau Mau and their leaders like Kenyatta, and Harry Thuku, killing suspected Mau Mau fighters like Kihika and Githua, and beating and killing sympathisers including women. Wambuku is an example in this regard. Africans were also subjected to forced labour in European farms, and hard labour in detention camps. Brutalisation, physical and spiritual subjugation of the African was the adopted policy, and District Officers like Robson and Thompson were the men in charge. The Mau Mau responded by killing Europeans and their collaborators, and we see a clash of social systems: Imperial capitalism against African socialism. Most Europeans in the novel hate Africans and have condescending attitudes towards them. This attitude is clearly seen when Thompson meets Mugo; "He held Mugo by the chin and tilted his face backwards. Then quite unexpectedly he shot saliva into his dark face. Mugo moved back a step and lifted his left hand to rub off the saliva. But the white man reached Mugo's face first and slapped him hard, once" (p. 73).

With colonialism, capitalism was aggravated. Hoarding and overcharging, as Gikonyo does with grain, and profiting from people's misfortunes became the accepted way of successful life. So did corruption and bribery.

## **Love**

The theme of love is centred on the rivalry between Karanja and Gikonyo over Mumbi, and Njeri and Wambuku over Kihika. Right from their youth Karanja and Gikonyo rival for Mumbi's affection. Gikonyo succeeds and Karanja is devastated by his failure. He cannot reconcile himself to the fact that he has lost her to the carpenter. Despite the fact that he knows that she is married to Gikonyo he still makes advances to her when Gikonyo is in detention. He finally succeeds in making her pregnant and nearly ruins the marriage. Njeri and Wambuku rival over Kihika. In the beginning, it seemed Wambuku was gaining the upper hand. But Kihika goes to the forest to fight the white man and Wambuku is devastated. She cannot join him there, but Njeri does. Love is also an issue between the Thompsons. John Thompson is too engrossed in his work as a colonial District Officer to attend adequately to his matrimonial responsibilities. Because of this his wife Margery lacks the love she needs, and has to get it elsewhere - from the drunken and repulsive Dr. Van Dyke.

## **Fate**

Certain events in the novel seem to be influenced by Providence. Providence delivers Mugo to Waitherero. It is by fate that people see in Mugo a leader, and consequently seek to saddle him with responsibilities. Mugo is destined to fail to plan his own life, much as he would like to. When he plans to farm and succeed as a farmer Kihika comes into his life, bringing him the risky and undesired responsibility of organising resistance in Thabai. His decision to betray Kihika is assisted by a fortuitous event - the unexpected encounter with the poster announcing the price on Kihika's head. This encounter evokes in Mugo greed and hope. His arrest, detention and failure to get the prize money not only reveal the hollowness of colonial promises, but also the futility of Mugo's efforts to direct his own destiny. The more Mugo tries to avoid responsibility the more the society heaps it on him. The villagers want him to lead the Independence Day Celebrations and despite his reluctance he is pestered.

Mumbi is sent to persuade him. Her visit to his hut is a replay of Kihika's previous visit and this too is fortuitous. He attempts to get rid of her as he had tried to get rid of her brother. This similarity in the occurrence of events is entirely due to fate. Another event replayed is the races. The Independence Day race, like the previous race to the railway station between Karanja and Gikonyo is also for Mumbi. The two races are also symbolic of the futility of human effort in directing man's destiny. Although Mugo tries his best to avoid death in the hands of the colonial authorities or Mau Mau, he fails as the ex-Mau Mau fighters exact their revenge.

The theme of fate is also revealed through John Thompson who sees himself fated to contribute significantly to the building of the British colonial empire. His failure in this regard can also be interpreted as man's failure to direct his own destiny.

## **Reconciliation**

By the end of the novel, this seems to be the moral. Reconciliation must occur at two levels: at the self-level first, then at the social level. As Howard (1982: 113-114) observes; "Each major character develops through a real personal failure occasioned by the emergency to a process of reconciliation with that in an attempt to continue life. Each figure after experiencing the tragedy of personal cowardice and personal failure is forced by the present to choose his future course".

Mugo has to reconcile with himself in order to get the courage to confess before all, on Uhuru Day, that he is the long sought for betrayer of Kihika. Mugo's confession pricks the consciences of all the major characters, who then must reconcile with themselves first before reconciling with others. In a way Mugo can be considered the society's collective conscience. His confession makes others re-examine themselves. Even Wambui feels guilty for having sentenced him to death. After all, the struggle for independence was in vain, and everyone has betrayed in

various ways and should also be tried, sentenced and killed. When Gikonyo learns of Mugo's public confession he is immediately changed, and is then prepared to discuss Mumbi's child by Karanja. Even Thompson feels the need to confess and start life anew.

## **Conclusion**

In conclusion in analysing any selected literary text in light of the sociological theories of criticism, the teacher will have to examine: the society that produced the author, the social relations portrayed, the social issues (themes) arising from the social relations, the resolution of the social issues, or how the author proposes that they be best resolved. It is the author's proposals that form the morals or lessons to be derived from the text. The questions framed to guide the learner's reading and responses must be those that will reveal the salient social features.

## **Recommendations**

For the teacher of literature in Secondary Schools to develop reading, comprehension, analytical, interpretative and response skills in learners, he himself must be proficient in those skills. The skills can be best developed through a university literature education regime that is vigorous, thorough and systematic right from the first year. A variety of well-selected and graded literary texts should be made available and used to develop those skills practically. A variety of salient authors should be studied across the genres. The university literature courses should not only be practical, but also allowing for exploration (Rousenblatt: 1982). The courses should train the prospective teacher to read, think, consume and produce literature. It should not merely describe general facts about literature as is currently the norm in public universities in Kenya. After each literature course, pedagogical education should be provided.

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## INTERPRETATION OF THE QUR'AN AND ITS INFLUENCE ON GIRLS' ACCESS TO SECONDARY SCHOOL EDUCATION IN KENYA

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### **Abstract**

Interpretation of the Qur'an, which is linked to analyses of the practices of Muslims within a given socio-cultural milieu, is a fundamental aspect in understanding Muslim beliefs and practices. This paper demonstrates that interpretation of the Qur'an regarding the status of women in society influences girls' access to secondary school education in Kenya. This interpretation shapes individual Muslim's perceptions on the role of women. The perceptions relate to gender equity, gender role ideology and marriage. Muslim practices such as veiling and seclusion of women, and gender segregation hinge on the interpretation of the Qur'an, all of which have a bearing on Muslim girls' access to secondary school education. Besides interpretation of the Qur'an, other factors that influence Muslim girls' access to secondary school education include: co-education, distance to **school, school sponsor, madrasa (religious) education, poverty and the informal curriculum.**

### **Introduction**

The Qur'an is one of the primary sources of Muslim conduct. The other is the Hadith (sayings of Prophet Muhammad). The interpretation of the Qur'an is fundamental to understanding Muslim beliefs and practices because some verses of the Qur'an such as those regarding gender, (4:34) and dressing for women (24:30-31), are ambiguous and susceptible to different interpretations (Wadud-Muhsin 1992,73; Khalidi & Tucker 1996,10). Largely, interpretation of the Qur'an, is a product of culture proclivities of Muslims, either as individuals or as a community. Hence, interpretation of the Qur'an is linked to analyses of the practices of Muslims within a given socio-cultural milieu.

Although, Islam per se is not a cause of gender imbalances in education access, opportunities and provision, interpretation of the Qur'an shapes individual Muslim's perceptions on the role of women. This influences the importance attached to the education of girls. These perceptions relate to issues of gender equity, marriage, gender role ideology, practices such as seclusion and veiling of women, and gender segregation. All these hinge on the interpretation of the Qur'an, and have a bearing on Muslim girls' access to secondary school education.'



## **Rationale for the Choice of the Study Area**

The geographical area for the study was Mombasa and Kwale districts of Coast Province. Mombasa, an urban district, was selected for its diverse predominant Muslim population. The district has a high illiteracy rate among women. Girls' dropout rate is higher than the boys', a situation that could be attributed to influences such as early marriages, pregnancy and priority to educate boys than girls (Republic of Kenya 2002-2008b,25).

Kwale, a rural district, has a predominant Muslim population with unofficial estimates of the Digo Muslim population as high as 90 per cent (Wamahiu 1988,335). Generally, formal education in the district is characterized by low participation and high dropout rates of girls, (Republic of Kenya 2002-2008a,10). Most schools in the district, have a shortage of trained teachers and inadequate physical facilities (Republic of Kenya 1987; Republic of Kenya 1997-2001). Girls' formal education in Kwale is constrained by influences such as early marriages, roles of women, child labour, teenage pregnancies; and socio-economic factors as such poverty, divorce and polygamous marriages, (Wamahiu 1988; Republic of Kenya 1987; Republic of Kenya 1994-1996; Republic of Kenya 1997-2001; Republic of Kenya 2002-2008). All these factors reinforce gender inequality in access to secondary school education.

Urban and rural settings influence girls' education in that schools in the urban areas of Mombasa have better facilities than the ones of rural Kwale. Economically, Kwale is a marginal district and compared to Mombasa, it has a deficient infrastructure. There is a shortage of fresh water resources, and electricity and telecommunication facilities are inadequately supplied in Kwale District (Republic of Kenya 1997-2001,55-56). All these economic factors have a bearing on the development of education in the district.

The distance from one school to the other in the vast Kwale District is enormous compared to Mombasa. Distance to school is a factor that influences girls' access to education (Don 1984; Kelly 1984; Hyde 1993).

The practice of Islam in Mombasa and Kwale districts is influenced by local Afro-Arab cultural practices among the Muslim communities. For example, in Mombasa some practices such as female seclusion are attributed to Arab culture while early marriages are traced to both African and Arab cultures. These practices influence communities' perception of girls' education. The practices of veiling and seclusion among Muslim communities are different. While in some Arab and Swahili communities in Mombasa, there is, absolute veiling, in others, such as the Digo in Kwale, the veiling is not a symbol of seclusion, (Wamahiu 1988:297).

The study was confined to secondary schools because of the following reasons:-

- (i) Muslim girls start practising *pardah* (veiling) with the onset of puberty when they are in the upper primary or at the lower secondary school level. Due to

*purdah*, a girl may be withdrawn from school, (Porter 1990; Porter 1992; Don 1984).

- (ii) With the onset of puberty, some Muslim parents are reluctant to send their daughters to co-educational schools due to the religious reasons underlying the intermingling of sexes. Alternatively, some parents are uncomfortable to have their daughters in non-Muslim schools where they may not be allowed to practise their religious rights such as wearing the *hijab* (veil). These two factors influence the education of Muslim girls.

### **What the Qur'an Says about Education**

The pursuit of knowledge and education was an important component of the revelation of the Qur'an. The first word of the revelation was; "read" ("recite" or "proclaim") as evidenced in the first chapter of the Qur'an (96:1-5). In addition, the Qur'an contains verses and expressions that stress the need for Muslims to acquire knowledge and seek education. These verses and expressions demonstrate the importance the Qur'an and Islam attaches to education. A few examples could suffice. Swearing by the pen, highlights the value and dignity of knowledge (68:1-2). God is presented as the source of knowledge - wisdom (2:269). Knowledge is identified with those who fear Allah (35:28). Lack of knowledge, makes people to revile the true God (6:108). Those who lack knowledge are ranked lower than the ones who possess it (39:9). Possession of knowledge and faith are prerequisites for the religion of Islam (58:11). It is knowledge that makes human beings superior to other creatures (2:31 -34).

It is instructive to note that, the Qur'anic verses that enjoin Muslims to seek knowledge and education are not gender specific. This implies that seeking education is meant for all Muslims regardless of sex. Nevertheless, owing to interpretation of the Qur'an on the place and role of women in society, that is, couched in cultural baggage of male domination, girls' education seems to be on the periphery. The interpretation of the Qur'an on the status of woman is analysed within the backdrop of issues governing sexual inequality, marriage, gender role ideology, seclusion and veiling of women, and gender segregation. All these shape the perceptions toward the secondary school education of Muslim girls.

### **The Influence of Gender Equity on Muslim Girls' Education**

The teachings of the Qur'an contain materials that could be used to advance the theory of gender equity and also the theory of the superiority of males over females. To a greater extent, these theories hinge on the interpretation of the Qur'an. A cursory glance at some Qur'anic verses visualises the potential equality between the sexes. For example, chapter 4:1 (cf., 49:13) shows that a woman equals a man in that both were created from the same substance and soul. The Qur'an also assails the pre-Islamic Arabs' conception and treatment of the girl child (16:58-59; cf., 81:8-9). Besides, the Qur'an disabused women of the various

pre-Islamic practices that de-humanised them (4:19). The rights granted to males and females are similar (2:228) and the status of men and women before God is the same (9:71-72). The Qur'an also acknowledges the role of women in the process of revelation (48:25) and in the moral and spiritual development (4:124). Women are portrayed as equal partners with men in the execution of religious obligations such as obligatory prayer (2:110), pilgrimage (3:97), fasting (2:183), payment of obligatory alms (2:110) and observation of the fundamental articles of Islam (4:136). The Qur'an further shows that, man and woman will earn rewards in the hereafter not because of their sex but in accordance with the way they practice the principles of Islam (4:32; 33:35; cf., 3:195; 4:124; 16:97; 9:71-72; 43:70).

The foregoing demonstrates the potential gender equity that is apparent in some of the Qur'anic verses. Yet, the proponents of the superiority of males over females interpret the same verses to argue for the gender inequity. For example chapter 2:228 is interpreted to justify male dominance that is the essence of patriarchal ideology, as discussed later in this article.

Other Qur'anic verses that are fundamental to the debate on the superiority of men over women relate to the economic maintenance and protection (4:34); reasoning and argumentation (43:18); law of inheritance (4:11-12,176); polygamy (4:30); divorce (2:228-235; 4:35, 130; 33:49; 65:1-6) and the view that the testimony of one man is equitable to that of two women in a court of law (2:282).

Our survey revealed that cultural lore and values influence the interpretation of Qur'an. Verses that deal with issues of gender equity are interpreted to imply that men are superior to women. This interpretation is reinforced by the cultural norms on male domination that theorise the superiority of men over women. Social norms on male domination are disseminated through the process of socialisation in the family, society, workplaces, educational and social institutions such as schools and mosques.

Hence, although the Qur'an is categorical on gender equity, verses are interpreted to show that woman is inferior to man. This subjective interpretation that gives religious legitimacy to gender inequity is reinforced by social lore that depicts women as subordinates. By corollary, women are considered less intelligent and deficient in knowledge, while men are considered better endowed with intelligent and judgment. In the same vein boys are considered superior to girls in intelligence as they can think deeply. This attitude and mentality influence girls' access to secondary school education. Some parents have negative attitude to secondary education of their daughters due to the presumption that girls cannot contend with the rigors of secondary schooling. While boys should be educated as future providers of women and children, girls' education should be tied to their domestic role of parenting and caring for children.

## **The Influence of Marriage on Muslim Girls' Education**

Marriage is a religious duty in Islam. It is an act of piety; a solemn covenant between Allah and human parties on one hand and between man and woman on the other hand (4:21). The Qur'an further gives guidelines on marriage. For example, men should marry chaste wives (4:3, 24; 5:5). The degrees or categories of the prohibited marriage partners are stipulated (4:22-24). Marriage between Muslim men and Jew or Christian women is permitted (2:221; 5:5-6; 60:10). Marriage is an important socio-religious institution whose purpose is to provide companionship (30:21; 7:189), emotional gratification (2:223; 30:21) and procreation (4:1); promotion of friendship, unity and co-operation between families and lineages (25:54). The Qur'an emphasizes that a marriage should be governed by good treatment and companionship for the partners. This relationship should be an epitome of love, mercy and interdependence between husband and wife (2:187). One of the conditions of marriage is giving of a dower by the man to his bride. This is a marriage gift that symbolizes love and affection and is enjoined by the Qur'an (4:4, 19-21, 25; cf., 2:229,236-237).

Evidently, there exists a strong marriage ethic among Muslims of Mombasa and Kwale districts. This is due to the importance that the Qur'an and cultural values attach to marriage. Although there are no specific issues on marriage that bear directly on interpretation of the Qur'an, arguably Qur'anic teachings have combined with cultural value systems to shape the people's world view on marriage. **Hence** Qur'anic teachings on marriage are interpreted as be-all and end-all of a girl's life. This generally impacts negatively on girls' education.

The strong marriage ethic implies that marriage and upbringing of children are the most important and greatest ambition in the life of girls. It is their ultimate destiny. Marriage is the epitome of womanhood. This is an attitude that is a product of misinterpretation, social norms and values in patrilineal societies where girls are expected to marry and leave their parents' homes. Popular social belief stemming from values attached to marriage considers a girl's education a lost investment. This mentality has long lasting negative implications on the education of girls as they influence the importance attached to secondary school education. Primary education whose completion coincides with the biological maturity of girls in readiness for marriage is seen to be sufficient enough for them. In the midst of socio-economic difficulties, some families prefer to educate boys and leave out girls. This constrains girls' access to secondary school education.

## **The Influence of Gender Role Ideology on Muslim Girls' Education**

The Qur'an gives clear guidelines regarding the roles of both men and women in a Muslim family. Chapter 4:34 is precise on the definition of roles:

Men are the protectors and maintainers of women, because Allah has given the one more (strength) than the other, and because they support them from their means. Therefore the righteous women are devoutly obedient, and guard in (the husband's) absence what Allah would have them guard (cf., 65:7)

The above verse is fundamental in regulating the division of roles in a Muslim family. The verse spells out that man is the breadwinner and head of the family while woman is the homemaker and caretaker. Although the role of man should be viewed as responsibility and not exalted status of man vis-à-vis woman some men interpret this verse to mean the subjugation of women and despotism (Iqbal 1989,17; Maina 2003,147). That is, a blatant disregard of the Qur'an's teachings on equality of sexes discussed earlier. Owing to cultural ethos of male domination, obedience of the wife to the husband - as required in Chapter 4:34 - is interpreted literally by some Muslims as subservience of the wife to the husband and also justification for male supremacy and violence against women (Mernissi 1991: 156-157).

There is nothing to suggest that, the Qur'an attaches more significance to the roles that men perform at the expense of women's role (Maina, 2003:153). However, by designating men as guardians of women, the Qur'an is interpreted to sanction patriarchal power. Through the cultural lens of androcentrism, interpretation of the Qur'an on the perceived roles of men and women in society has entrenched gender role socialization. Within a Muslim household, the delineation of roles implies that females operate within the domestic and private sphere while males operate within the public sphere (Maina 2003:175-176). The spatial confinement of female roles implies that all activities outside the private domain are unnecessary for women. Since a woman is to be provided for, she may not feel obliged to engage in income generating activity or joining the labour force and education as a tool for economic advancement will be subservient. The perception of females' roles therefore influences girls' access to secondary school education. Where these roles are interpreted to be restricted to the private domain, girls' education is equally restricted (Maina 2003:176).

Qur'anic injunctions grant women various rights. Nevertheless interpretations repress the need for women to seek education, engage in employment, politics **etc.** Due to interpretations, women's roles are deemed not to require advanced **or** secondary education. In the long run, interpretations of the Qur'an and **the** internalisation of cultural values on the role of women in society **impacts** negatively on girls' schooling. A high premium is placed on educating boys **who** are purportedly the ultimate heads and breadwinners for the family. As **mentioned** before, educating girls beyond primary school may be seen to instil the **wrong** work ethic as they may become disinterested in the roles that pertain **to the** domestic sphere like cooking, cleaning and parenting.

## **The Influence of Veiling and Seclusion on Muslim Girls' Education**

The debate on veiling and seclusion of women has brought interpretations of the Qur'an into focus. Depending on interpretation, there are two main trends: the traditionalists and the modernist. The traditionalists advocate a total ban on women's appearance in public. They intertwine non-Islamic socio-cultural values with Islamic norms to justify the argument that, female seclusion is inherently Islamic. They take some ideals of honour of women to give moral and religious justification to seclusion (Jeffery 1979:33). For traditionalists, Muslim women should stay at home and never venture out of the house unless when it is necessary. Traditionalists cite Chapter (33:33) to justify close and complete seclusion of women: "And stay quietly in your houses, and make not a dazzling display, like that of the former times of ignorance. . ."

Research findings indicate that Chapter (33:33), is one of the verses that is interpreted and cited by some Muslims to argue that, the Qur'an prescribes seclusion. This verse is interpreted to be a general regulation to restrict women from wanton display of their ornaments and going out of their houses altogether (Wadud-Muhsin 1992:98; Maina 2003,199). Oral information attests that, "some people perceive seclusion as a method of enhancing morality. Seclusion is a check against rape and other social evils, since women are removed from society. Accordingly, honour, chastity and dignity of **women** lie in their **seclusion** (Maina 2003:208).

On the other hand, the moderates posit that the Qur'an does not explicitly stipulate that women should be secluded. According to them, the words: "And stay quietly in your houses", do not imply that women should not at all venture out of the house. Hence to confine women into the four walls of a house is wrong interpretation of the Qur'an and Islam:

Seclusion is not prescribed by the teachings of Islam. It is as a result of misinterpretation of the people. It is oppressing to women. A woman should not be secluded. She should be free to move out of the house, so long as she does not exceed the limits of religion (Maina 2003,199)

The modernists argue that, confining women is not a normal way of guarding their modesty. On the contrary, confinement is prescribed as a punishment for lack of chastity (Hassan 1996:382; Maina 2003:200). The argument by modernists is, if women were not allowed to leave their houses, then the injunctions that require women to cast down their looks and prescription of the veil for women (24:30-31; 33:59) is superfluous (Siddiqi 1992:146; Siddiqi 1992a.: 1; Maina 2003;200)

Though veiling and seclusion are two sides of the coin, veiling is interpreted to mean seclusion. Evidently, this interpretation borders on misunderstandings of the meanings of the text on non-intermingling of sexes (Maina 2003:199).

The various postures regarding female seclusion and veiling of women therefore depend to a greater extent on the interpretation of the Qur'an. Some of the verses on veiling that are so interpreted are: 24:30-31, 58-60; 33:32-33, 55, 59. Female seclusion acts to control the participation of women in public domain. This enhances the domination of males over females by limiting women's sphere of activities and social space. Seclusion, as mentioned earlier, is supported by social customs and reinforced by interpretations of the Qur'an.

Female seclusion has far reaching implications on the social, economic and political roles that women play in modern society. It restricts women's upward mobility in socio-economic opportunities and girls' access to schools, colleges and universities. A secluded and confined woman cannot play her rightful role in modern society. Seclusion is dependant on the premise that men are the providers of the family. This curtails the economic contributions of women in employment and income generating activities as her role is largely confined to the domestic realm. Within the area of study, seclusion of women is not a common practice. Nevertheless, where it occurs, it has the effect of keeping women and girls ignorant. This is because proponents of female seclusion argue that girls should be educated in privacy or within sexually segregated facilities where their identity may not be revealed (Wamahiu 1990:6; Maina 2003:220). Keeping girls at home on the onset of puberty, as the rules of seclusion demand, hinders their access to education and upward mobility, since seclusion leads to their dropping out of school.

### **The Influence of Gender Segregation on Muslim Girls' Education**

Islam discourages unrestricted freedom between the sexes. It forbids casual intermingling of sexes with the intention of guarding society from sexual immorality. Mixing of sexes creates disorder (*fitna*) because the female sexuality is considered more potent, powerful and dangerous than the male (Maina 2003:213). Gender segregation in mosques, work and social places and schools is meant to protect men and women from sexuality. According to the teachings of the Qur'an, man and woman are not permitted to remain alone with a person of the opposite sex except his or her partner or the *mahram* [pl. *maharim* - male relatives with whom a woman cannot contract a marriage] (24:30-31; 33:55).

Gender segregation affects Muslim girls' access to secondary school education owing to lack of, or shortage of girls' schools. This has a bearing on co-education that is discussed later in this article. Where there are no girls' schools or single sex schools for girls, many girls are denied the opportunity of joining secondary schools. This is because many Muslim parents have apathy to mixed schools for their daughters. Where there are no separate facilities for girls in mixed schools, some parents view such schools as fertile grounds for sexual liaisons that could

lead to pregnancy and the girl dropping out of school. To protect the family's and the girl's honour, such parents prefer their daughters to stay at home instead of attending a mixed school after Standard 8 - the last class in the primary level cycle which ushers one to secondary school education. Alternatively, Muslim parents prefer their daughters to join single sex schools. Gender segregation in schools explains why Muslim sponsored private schools in Mombasa register high enrolments of Muslims girls. These schools have facilities necessary for the segregation of sexes.

Besides the interpretation of the Qur'an, there are other factors that influence Muslim girls' access to secondary school education. These factors include: co-education, distance to school, school sponsor, madrasa or religious education, poverty and the informal curriculum, among others. Let us now briefly discuss each of these factors.

### **Co-Education**

As earlier mentioned, co-education, which has a bearing on gender segregation, influences Muslim girls' education. Islamic teachings that govern the segregation of sexes and proper gender relations militate against co-education. Co-education is contrary to the spirit and teachings of Islam. Muslim parents are reluctant to send their daughters to mixed schools because of casual mixing of sexes. Instead, they prefer to send their daughters to single sex schools or Muslim sponsored schools where boys are segregated from girls. However, within Mombasa and Kwale districts, there is a shortage of, or non-availability of single sex schools or mixed schools with separate facilities for boys and girls. Opposition to mixed schools therefore, disadvantages girls' access to secondary school education.

### **Distance to School**

Distance from home to school influences Muslim girls' access to education. The location of a school makes it accessible or closed to Muslim girls. This is because a Muslim woman is not supposed to travel for long distance unless accompanied by a mahram. As mentioned earlier, this is based on the teachings of the Qur'an (24:30-31) and supported by a hadith that says: "a woman should not travel for a day or night unless she is accompanied by a mahram" (Mawdudi 1995, 191-192). In that respect, therefore, where there are no schools within the locality and vicinity, or schools are not within easy reach by girls, some parents may be reluctant to send their daughters to distant secondary schools. A long distance to school is likely to expose her to moral and physical danger.

From a moral perspective, some Muslim parents feel that, girls who attend distant schools may be susceptible to developing sexual relationships with boys. This could bring disrepute that could damage her honour and that of the family, especially if she gets pregnant. Therefore, moral and safety concerns make parents



to feel obliged to send their daughters to schools that are located near home. If the school is closer to the home, parents are less anxious about their daughters' safety and reputation.

Daily commuting to school, where majority of schools especially in the vast Kwale District do not have boarding facilities, is a factor in girls' access to secondary education. Besides moral and safety concerns, the use of public transport on a daily basis is expensive depending on the distance covered. This is something many parents can ill afford.

### **School Sponsor**

Depending on a school, the objectives and policies of a sponsor may influence Muslim girls' access to secondary school education. This is in a situation where the sponsor, for example a religious organisation, may want to further its religious interests in the school it sponsors. Conflicts and controversies arising in non-Muslim, mainly Church sponsored schools where the religious rights of Muslims have seemingly been undermined, have continued to influence girls' access to education in the two districts. In the past, Muslim girls have had problems in practising their faith in Church sponsored schools. Muslim parents may fear to send their daughters to non-Muslim schools. Whether this fear is real or imagined is another case altogether. Nevertheless, parents prefer Muslim schools or educational institutions where their daughters could practice their faith without interference. There is a limitation to this inclination due to the few Muslim sponsored schools in Kwale and Mombasa. The apathy towards non-Muslim schools therefore influences Muslim girls' access to secondary school education.

### **Madrasa (Religious) Education**

Muslim girls attend both secular school and the *madrasa*. The *madrasa* offers religious and moral training to Muslim children. The subjects that are taught in a *madrasa* include among others: reading and recitation of the Qur'an, Hadith, Arabic grammar, notions in Islamic Jurisprudence (*Fiqh*) etc.

Madrasa education influences girls' access to secondary school education. Some parents prefer to take their daughters to *madrasa* instead of secular schools. In other cases, some girls join primary school rather belatedly since some parents insist on their children completing Qur'anic instruction first before joining secular school. This implies that, such girls are big by the time they join secondary schools. With the parental fear of their daughters becoming pregnant, the chances of such girls completing their secondary school cycle are drastically reduced, as they may be withdrawn from school to be married off. In addition, attendance of *madrasa* makes some girls ambivalent towards western education. This is because they have to combine religious education and secondary education concurrently. This implies that, the *madrasa* and the secular school compete for the learner's

time. The effect is lack of interest and hence poor performance of girls in education

### **Poverty**

Another factor that influences Muslim girls' access to secondary education is poverty. Poverty has implications on girls' access to secondary school education. Firstly, when poverty reigns, families tend to invest their meagre resources on the education of boys. When the socio-economic advantages of educating boys weigh over that of girls', some parents prefer investing in educating sons to daughters. This is because sons are perceived as the future breadwinners and economic mainstays of the families. As earlier mentioned, when harsh economic realities combine with cultural values, some families consider girls' education as lost investment. If there are limited economic resources, girls' education is sacrificed. This leads to low participation of girls at the primary school that cumulatively affect their access to secondary schools, tertiary institutions and universities.

Secondly, in a low-income family or single household family, where parents have to choose between educating a boy or a girl, girls may be forced to leave school. This is done so that she could work to supplement family income or to assist a working mother who may be the sole breadwinner. Poor families cannot afford to take their daughters to boarding schools or private schools that are expensive, but offer quality education. In most cases, poor parents are complacent with day schools, where they have to pay less, and their daughters have to commute daily to school. This situation is more common in Kwale than in Mombasa. Daily commuting to school as already been pointed out, has implications on girls' access to education.

### **Informal Curriculum**

The informal curriculum is contained in the ways that subject material is presented in the classroom through the teacher's interaction with the students and the various portrayals of men and women in the textbooks (Obura 1991; Porter 1992; El-Sanabary 1994). Within the school, the informal curriculum affects girls' educational performance and attainment. Gender role images are transmitted through classroom interaction between the teacher and the students. Hence girls tend to avoid or to put little effort in subjects such as Mathematics and Science. Gender role images are further enhanced through textbooks. This has a negative effect on Muslim girls' schooling since girls may channel their energies to the stereotypical subjects that are seen as extension of the gendered roles of parenting and housekeeping. This therefore limits girls' educational horizons and career choices.

## **Conclusion**

This paper has examined the interpretation of the Qur'an and its influence on girls' access to secondary school education in Mombasa and Kwale districts of Coast Province, Kenya. The teachings of Islam predicate its progressive nature in ameliorating the status of women. However, due to cultural values on male domination Qur'anic injunctions regarding the rights of women are interpreted in a way that does not always favour women, as their various rights are hardly fulfilled. These include the right to education.

Interpretations of the Qur'an favour male interests that restrict the status of women to role expectations. These interpretations stem from patriarchal attitudes and prejudices that are supported by religious discourse and embedded in cultural values on male domination. The domino effect of values of male domination and female subservience assumes a *priori*, boys' education is more important than girls'.

The Government of Kenya has in the recent past put in place measures to address some of the problems discussed above. These include: firstly an ongoing review of the Education Act to provide a legal framework to improve management, co-ordination and quality control in education and consolidation of the national plan on Education for All (EFA) which will identify strategies for improving girls education for the next ten years. Secondly, the Ministry of Education has developed a Gender Education Policy paper to address among others, the elimination of gender disparities in access, transition, retention and performance and developing literacy and post-literacy materials that are gender responsive and easily accessible to all learners. Thirdly, Non-government organisations complement the government's efforts in improving girls' education within the area of study. For example, in Kwale District, The Girl Child Network has been using mentors to act as role models to girls in schools ([www.oxfam.org.uk](http://www.oxfam.org.uk)). This effort has gone a long way in promoting the positive images of girls in schools. It should however be pointed out that the government's efforts in promoting girls' education remain largely a range of policies that have not been legislated.

## **Recommendations**

In view of our discussion in this paper, we need to make a few recommendations and the way forward. If the proper teachings of Islam on the status of woman are practiced, the position of women could improve tremendously. This means casting away the conservative interpretations that portray a Muslim woman in subordinated roles.

The Qur'an alludes to a change of attitude (13:11). This means that for the Qur'an to maintain its relevance for Muslims at all times, the context of the revelations of

the verses regarding the status of women should be taken into perspective. This implies a continual reinterpretation of the Qur'an in the context of the socio-economic and political changes taking place in the Muslim communities.

There should be policy intervention in: poverty reduction programmes and establishment of single sex schools or schools with separate facilities for girls to improve Muslim girls' access to education. The provisions of Education Act regarding religious rights should be followed in all schools. This is important in order to remove the apathy apparent among Muslim parents whose daughters attend non-Muslim schools.

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**EFFECTS OF THE CONCEPT MAPPING  
STRATEGY ON STUDENTS'  
CONCEPTUALISATION OF SURDS AND  
LOGARITHMIC NOTATION IN MATHEMATICS**

*Antony Henry Gakuyo and Helen O. Mondoh*

**Abstract**

Researchers attribute poor performance in mathematics to inadequate teaching methods by mathematics teachers. However, very few researchers have tried out interventions based on alternative teaching methodologies. The study on which this paper is based was an attempt towards filling this gap. It sought to determine the effect of using the concept mapping strategy (a technique that would enable learners to relate various mathematical concepts) on students' conceptualisation of the topic "Surd and Logarithmic Notation". This topic is taught in Form Three and is reportedly one of the most challenging topics for students. The study was carried out in a mathematics classroom setting. A sample of 180 students was drawn from four purposively selected mixed district public secondary schools in Nakuru District, Kenya. Three instruments namely: Mathematics Achievement Test (MAT), Students Interview Guide (SIG) and Teachers Interview Guide (TIG) were used to collect the required data. To test the hypotheses, quantitative data was generated and analysed using inferential statistics (t-test, Pearson's r, ANOVA, F-test and Post Hoc- tests) at  $\alpha=0.05$ . The study concluded that the concept mapping strategy enhanced students' conceptualisation of mathematical concepts especially in the topic 'Surd and Logarithmic Notation'. It recommended that mathematics teachers should be introduced to the concept mapping strategy during pre-service and in-service training.

**Introduction**

During the last decade Mathematics was ranked among the five worst performed subjects at the Kenya Certificate of Secondary Education (K.C.S.E) examination (KNEC, 2000). This was attributed to many factors and in particular poor teaching methods, students' inability to relate and organise material in the time allowed for study, and poor retention of concepts (Kinyanjui 1993; KNEC 2000; Mestre 2000; Mureithi 2000; Ongati 2000). The deductive methods of instruction currently in use for teaching mathematics in most secondary schools in Kenya have in particular been blamed for students' inability to achieve meaningful learning (Githua 2002; Mureithi 2000). The gains from the use of concept maps as instructional tools are evident in science courses as shown by the findings in

**various** studies conducted in the various areas of science (Novak & Musonda 1991; Okebukola 1992; Horton *et al.*, 1993). However, there is inadequate information on effects of concept mapping as an instructional tool in mathematics education.

The purpose of the study was to use the concept mapping teaching strategy to teach mathematical concepts in the secondary school mathematics topic 'Surds and Logarithmic Notation' and then measure its effect on students' conceptualisation of the same.

The study was guided by two specific objectives:-

- (i) to establish whether there is any statistically significant difference between students exposed to the concept mapping strategy and those that are not; with regard to conceptualisation of the mathematics topic 'Surds and logarithmic notation'; and
- (ii) to establish whether there is any statistically significant relationship between the students' ability to construct good concept maps and their conceptualisation of the mathematics topic 'Surds and Logarithmic Notation'.

Two null hypotheses were statistically tested:

Ho1 There is no statistically significant difference in the conceptualisation of the mathematics topic 'Surds and Logarithmic Notation' between students exposed to the concept mapping teaching strategy and those not so exposed.

Ho2: There is no statistically significant relationship between students' ability to draw good concept maps and their conceptualisation of the mathematics topic 'Surds and Logarithmic Notation'

## **Methodology**

The study adopted the Solomon Four-Group Design, which according to Gall *et al.*, (1996) is considered sufficiently robust and appropriate for experimental studies. Participating schools were purposively selected from public district secondary schools in Nakuru district Kenya, based on their matching characteristics in terms of learning resources, category of the school and also distances apart from one another. The district has both urban and rural schools that cater for students from varying ethnic backgrounds, and thus provides for diversity in the sample. Like most schools in the country, schools in Nakuru district also perform poorly in mathematics (KNEC 2000; 2002). The sample was therefore quite representative.

The mixed District secondary schools were selected by the simple random sampling technique using a table of random numbers. The same technique was used in the selection and assignment of schools to either experimental or control groups.

Purposive multistage cluster sampling was used to select Form Three streams in the selected schools. Form Three was chosen because the topic "Surds and Logarithmic Notation" is covered at this level. A single stream in the Form Three class was targeted in each of the schools. The teachers involved in this study had a minimum qualification of a Diploma in education. These teachers had taught mathematics in Form Three or Form Four for at least Two years. This ensured homogeneity of the teachers involved in the study in terms of expertise and exposure.

Since the subjects in the randomly selected groups used in the study were not randomly assigned, the following steps were taken to ensure this did not interfere with the validity of the final results obtained:-

- (i) The groups that took part in this study were randomly selected considering homogeneity in terms of intellectual abilities and facilities. Equal time was allocated to the teaching of the same content in all the four groups.
- (ii) Equal time was allocated to the teaching of the same content in all the four groups.

According to Leed (1989), these adjustments would ensure the successful use of Solomon Four-Group Design. Table 1 shows a diagrammatic representation of the research design.

TABLE 1: Paradigm of the Non- Randomised Solomon Four-Group Design

	O1	X	O2
Group 1	.....	C	O4
Group 2	.....	X	O5
Group 3	.....	C	O6
Group 4			

**Source:** Adopted from Gall *et al.* (1996), Cook and Campbell (1979).

Key: X = Experimental treatment  
 C = Control treatment (placebo)  
 O<sub>1</sub> and O<sub>3</sub> = Pre-test  
 O<sub>2</sub>, O<sub>4</sub>, O<sub>5</sub>, O<sub>6</sub> = Post-test

The concept maps were limited to concepts related to the topic "Surds and Logarithmic Notation" as was outlined in the approved Kenya Institute of Education (KIE) secondary school mathematics syllabus (KIE 1992), and the mathematics textbooks. On completion of the mathematics topic "Surds and Logarithmic Notation" students were selected randomly and interviewed. Twenty (20) students from each of the groups taught using the concept mapping strategy were selected. Their mathematics teachers were also interviewed. The purpose of the interviews was to obtain students' and teachers' opinions on the merits and demerits of the new method compared to the traditional teaching methods.



knowledge of the concepts related to mathematical operations using numbers, surds and logarithms. It also tested knowledge on the use of various Surds and Logarithmic notations. The concept maps drawn for use in training of the teachers who handled the treatment groups on how to use the concepts mapping strategy were prepared and scored using the guidelines given by ER (2002). Only those maps that attained a score above 70% were considered appropriate for use in the study. Two interview schedules; the Student Interview Guide (SIG) and the Teacher Interview Guide (TIG) adopted from Kiboss (1997) and modified to suit the study were used to collect qualitative data. SIG and TIG collected views on the appropriateness of the concept mapping strategy from participating students and teachers.

The concept mapping strategy was introduced in a natural instructional setting. This involved comparison between the treatment groups taught using concept mapping strategy and a control group taught by the traditional methods. All groups learnt the same topic in mathematics; "Surds and Logarithmic Notation". The treatment was administered as illustrated in Table 1. On completion of the topic, the students in all the four groups were tested using MAT. Before the actual treatment, teachers handling the experimental groups were taught how to draw, interpret, evaluate and use concept maps in the teaching of the mathematics topic 'Surds and Logarithmic Notation'. These teachers then used this method in teaching for fifteen (15) lessons (six double and nine single). During the course of teaching, the teachers also taught their students how to construct and interpret concept maps.

The collected data was analysed both descriptively and inferentially. To assess the effect of the concept mapping strategy on students' conceptualisation of the mathematics topic "Surds and logarithmic notation" a comparison of mean scores of pre-tests and post-tests was made using Analysis of Variance (ANOVA). Qualitative data collected using SIG and TIG were summarised using descriptive statistics (Means & Percentages) and used to compliment the quantitative data. A computer program: Statistical Package for Social Science (SPSS) Version 10.0 was applied to analyse the data.

## **Background Information**

### ***Concept Mapping***

Knowledge mapping began in the ancient days, when cave men and women sketched their knowledge about their environments in the form of symbols on the walls of caves. According to Brachman and Levesque (1985), knowledge mapping was first used in 'artificial intelligence' in the 1950s to try and mimic various functions of the human brain. Pask (1975), developed knowledge mapping between 1950s and 1970s. His interest focused on topics such as styles and strategies of learning. Today, several types of knowledge mapping tools have been developed

and a good example of this is the use of the concept maps. Novak (1977), and his graduate students invented concept mapping as a learning tool. Novakian concept maps grew out of Ausubelian learning theory in the mid 1960s. In the late 1980's and early 1990s, Horn (1989) in USA and Buzan (1993) in UK, took the concept maps into the business world. Buzan (1993) was particularly interested in creativity as a means of divergent thinking. The late 1990's witnessed the amazing growth and blossoming of the World Wide Web.

According to Novak (1990), concept mapping is a process in which a systematic representation of knowledge is created. Concept maps represent the most important concepts in ovals, boxes or circles. Concepts are usually connected using lines that are labelled and represent mere associations that are sometimes given levels. The relationship indicated by a line between two concepts is usually bi-directional but the name level shown on a map may be either unidirectional or bi-directional. Arrowheads are often included on the line so that the reader knows which way the relation should be read. However, in hierarchical maps arrowheads are often omitted under the assumption that the reader will read from top to bottom. Concept maps can be drawn manually by the use of a pen on paper or by chalk on chalkboard. They can also be drawn using a computer. Therefore it is an affordable teaching method for both the well-equipped schools and those that are poorly equipped.

### **Use of Concept Mapping as a Teaching and Learning Strategy**

The Kenya secondary school mathematics curriculum is organised in a spiral pattern (K.I.E. 1992). Most of the topics, which are taught later in the course, are built on the introduction given at the earlier stages of the course. According to Copeland (1979), this is a good approach to teaching of various concepts in mathematics. It calls for the teacher involved to be able to relate the new knowledge taught to what the learners already know. This enables the subsumption of these new concepts in the learners existing cognitive structures (Lefrancois 1997).

Concept mapping is a visual representation of knowledge structures (UNESCO, 1979). The emphasis is placed upon the relationships or links between concepts rather than on the explication of the concept in isolation from other knowledge (ER, 2002). Concept mapping permits both students and teachers to represent their conceptual framework externally, and provides the basis for dialogue to see if there is shared meaning, differing meanings and possible misconceptions. It offers instructors a powerful means (1) to assist learners to develop beyond representational to conceptual understanding and (2) to assess student knowledge and comprehension /learning (Jegede, Alaiyemola & Okebukola 1990).

Wandersee (1990) refers to concept maps as cartographies of cognition. The metaphor can be extended to include not only the end map product, but also the process of construction and interpretation of concept maps as a means of

epistemological rehabilitation, curriculum development and as evaluation measures. The critical attribute that renders them useful for these goals lies in their fastening of higher order ways of thinking (Wittrock 1992). Construction of maps allows and indeed, often forces us to represent our thinking as elaborated, categorised, synthesised, and evaluated structures (Willerman, Marvin & MacHarg 1999). Lefrancois (1997) argues that education must do far more than simply teaching facts and procedures. Students should not only learn, they should also learn how to learn. Although they need to accumulate facts and formulas, they should also grow in their ability and in their willingness to think. One of the grand goals of education in Kenya is to empower students. Thus students should be given the skills, attitudes, and information that will enable them to deal most effectively with life and that will empower them to solve their problems.

### **Formation of Mathematical Concepts**

White and Gunstone (1992), argued that students who do not have concepts at the formal level are prone to misconception, overgeneralisation and undergeneralisation. This is particularly true when the concrete objects that are considered are not physically present or when the concepts are abstract. According to Johnson and Rising (1972), the typical sequence for learning a mathematical concept progresses from perception to abstraction to integration and then to deduction. Concepts of the simplest order, such as addition, are formed as a result of repeated sensory or motor experiences. Concepts of higher order such as functions are formed when experiences and previously learned concepts are related through reflective thought.

Johnson and Rising (1972) also argued that mathematical concepts are learned in the following ways:-

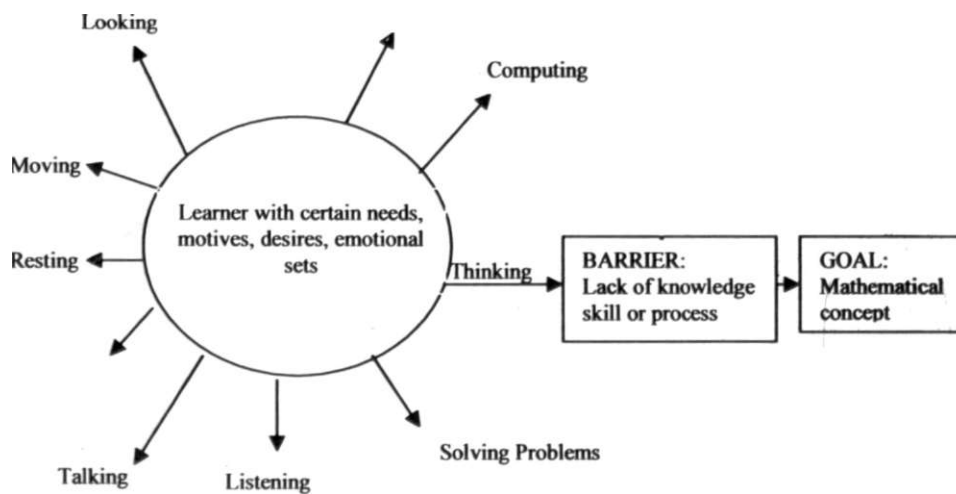
- (i) Sort objects, events or ideas into classes or categories.
- (ii) Become aware of relationships within the classes or categories involved.
- (iii) Find a pattern, which suggests relationship or structure.
- (iv) Formulate a conclusion that seems to describe the pattern of events or ideas involved.
- (v) Establish a generalisation by a deductive proof.

Therefore, mathematical concepts should be taught using a teaching method which, allows the learners adequate time to discuss the concepts and how they relate. Concept mapping strategy caters for this and can thus be very helpful when teaching mathematical concepts.

### **Concept Mapping and Students' Conceptualisation**

In a normal classroom situation the learner is usually preoccupied with several activities in the course of a mathematics lesson. Figure 1, shows some of the responses a student has during a mathematics lesson. To ensure optimum learning

in such a situation an appropriate teaching strategy, which will involve active participation of the student in the learning process, has to be used. A good example of such a teaching strategy is the concept mapping strategy.



Students' Responses During a Mathematics Lesson.  
Adopted from Johnson and Rising (1972).

Figure 1: Students' Responses during a Mathematics Lesson.

Fisher *et al.*, (1990), suggested that in more cases than not, knowledge mapping (for which concepts mapping is used as a tool) exercises of all types have the following effects on students' learning:-

- (i) Mapping provides sustained support for time on task in thinking about a topic.
- (ii) If mapping is done collaboratively, it can lead to extended discussion about the meanings of concepts and the relations between them.
- (iii) The act of creating an organised structure of ideas on paper or in a computer necessitates and often prompts the creation of such a knowledge structure in the mind.
- (iv) Knowledge mapping takes many cognitive and meta-cognitive skills that remained invisible for so many generations and makes them visible, explicit and accessible.
- (v) Mapping prompts students to make finer discrimination between ideas, another process at the heart of learning.
- (vi) The more one practises, the better one becomes at organising and relating concepts (Cliburn 1985).
- (vii) Each time two concepts are joined with a relation in working memory, that information is believed to be 'broadcast' to all the modules in the

brain so it can be used to solve any current problem the vast subconscious brain may be working on (Baars 1988).

## **Theoretical Framework**

The theoretical bases for this study were: Ausubel's Theory of Meaningful Learning (Ausubel 1963, 1968, 1978; Novak & Gowin 1984); The Information Processing Theory of Learning (White & Gunstone 1992; Lefrancois 1997); The Dual-Coding Theory (Paivio, 1986; Mayers & Sims 1994); and Gowin's Theory of Educating (Gowin 1981). According to the Meaningful learning theory, an object has meaning when it elicits an image in the content of consciousness as a result of something already known. A concept acquires meaning when it is related to an idea that is already present in the mind. The educators further argue that for a stimulus or concept to have meaning there must be something in the learners' cognitive structure (pre-existing ideas and knowledge) to which it can be related. For example, the word "car" has meaning for an individual only when it can be related to a mental representation of what cars are. Meaningful learning requires that the learner has already learned associated concepts to which new materials can be related (or in Ausubel's terms concepts that can 'subsume' new learning).

The Information processing theory of learning maintains that, knowledge does not exist in a vacuum but that it depends on relationships. According to White and Gunstone (1992) all of a person's declarative knowledge can be conceptualised as a large network of interrelated prepositions, in this context declarative memory. It consists of all the facts we have learned and all the experience we have had. In short, declarative knowledge involves knowing that something is the case. Declarative knowledge is contrasted with procedural knowledge (also called procedural memory), which involves knowing how to do something (that is, knowing a procedure for doing something). Procedural knowledge too, derives its meaningfulness from interrelationships (Lefrancois 1997).

Gowin's Theory of Educating advocates for the learning how to learn approach to educative events (Gowin 1981). It holds that concept mapping can guide students to the achievement of self-educating. It also maintains that when learners learn how to learn they take responsibility over their learning and start investing time and effort in materials and activities (actions) that will help them relate novel ideas to what they already know (Gowin 1981). According to Dual-coding theory (Paivio 1986; Mayer & Sims 1994), the learner can encode information in two distinct information-processing systems, one that represents information verbally and one that represents information visually. Dual coding facilitates ability to both retrieve and apply ideas (Mayer & Sims 1994). A knowledge map presents a visual image as well as verbal information and therefore presumably taps into this dual-coding system. Knowledge-mapping conventions place bigger ideas above the central concept, smaller ideas below, with moving materials or event sequences on a horizontal plane reading from left to right (Paivio 1986). These consistent spatial patterns serve as memory prompts, much as in any landscape. Figure 2 gives a

diagrammatic representation of the relationships among variables. It also summarises the theoretical framework of the study in a simple model.

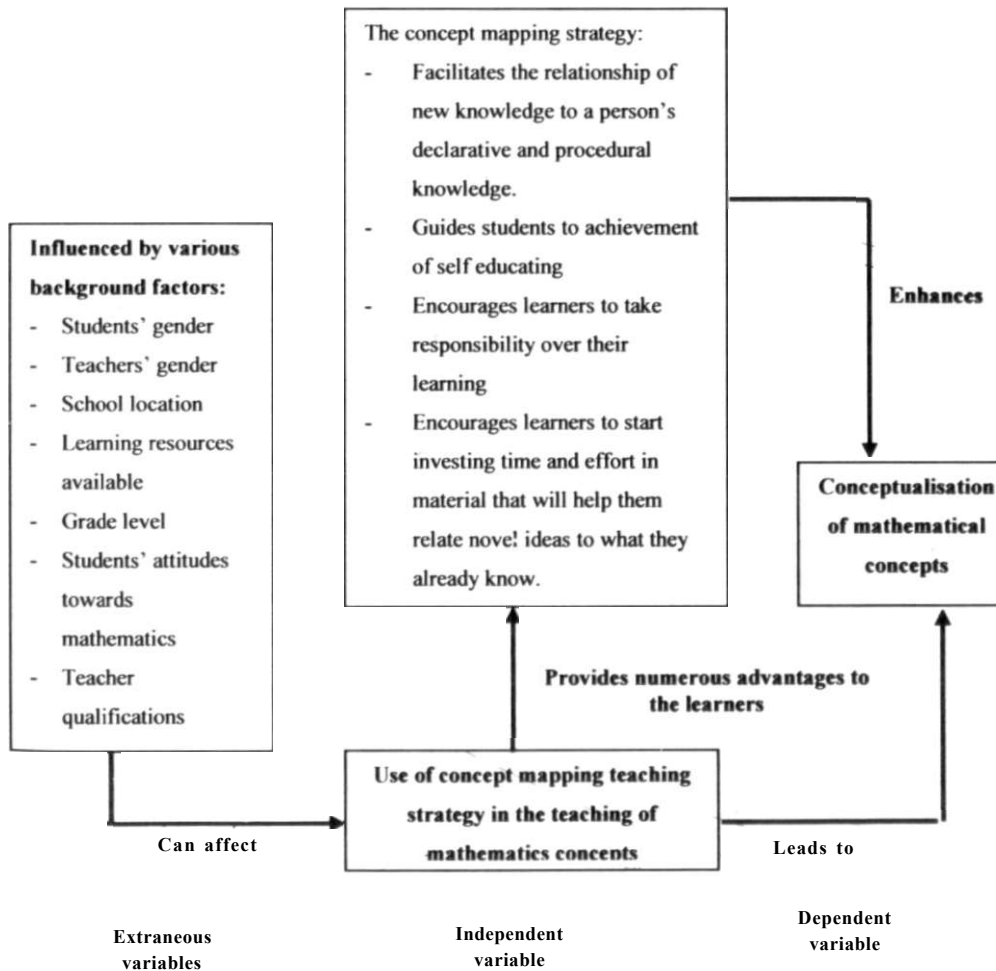


Figure 2: A simple model of effects of using concept-mapping strategy on students' conceptualisation of mathematical concepts in Kenya's

## Results, Findings and Discussion

### *Results of the Pre-Tests*

The post-test MAT mean scores in this study did not indicate any interaction between the pre-test and the concept mapping strategy treatment. If the pre-test provided a practice effect this could have been reflected in higher post-test performance by Group 1 and 2 than by 3 and 4. A comparison of the post-test results of the four groups does not indicate that the pre-tests provided any practice effect. The results therefore showed that the pre-test MAT was suitable for the study. A comparison of Group 1 and 2 students' pre-test MAT mean scores revealed non-significant difference  $t(90) = 0.515$ ,  $p < 0.05$ . According to Kothari (1990) such results show that the groups were quite similar before the administration of the treatment and hence can be treated as equivalent groups.

### **Effects of Concept Mapping Teaching Strategy on Students' Conceptualisation**

In order to determine the effects of the concept mapping teaching strategy on students' conceptualisation of the mathematics topic "Surds and Logarithmic Notation" an analysis of the students' post-test scores was carried out. Hypothesis  $H_{01}$  of the study sought to establish whether there is any statistically significant difference in the conceptualisation of the mathematics topic "Surds and logarithmic notation" between students exposed to concept maps as a tool for instruction and those not so exposed. Table 2 shows the MAT post-test mean scores obtained by the students. The results of the one-way ANOVA based on these means are shown in Table 3. The result shows that the differences in conceptualisation between the four groups is significant,  $F(3,164) = 2.991$ ,  $P < 0.05$ . Some students who took the pre-test and others who were initially involved in the study in the various groups were not available to take the post-test since they were out of school due to unforeseen circumstances.

**Table 4: MAT Post-Test Mean Scores Obtained by the Students in Four Groups**

Group	N	Mean Score
1	44	37.25
2	40	27.88
3	44	36.48
4	40	27.75
<b>Total</b>	<b>168</b>	<b>32.56</b>

**Table 3: Analysis of Variance (ANOVA) of the Post-Test Scores on the MAT**

	Sum of squares	df	Mean square	F	p-value
Between groups	2885.75	3	961.92	2.991	0.033
Within groups	52747.10	164	321.63		
<b>Total</b>	<b>55632.85</b>	<b>167</b>			

After establishing that there was a significant difference between the means, it was then necessary to carry out further tests on the various combinations of means to determine where the difference occurred. Table 4 shows the results of the **Least Significance Difference (LSD)** post hoc comparisons. LSD post hoc comparisons were preferred over the others since they could best help establish whether **there** was a statistically significant difference between the conceptualisation of **the** students who were taught using the concept mapping strategy and those **taught** using the conventional method as required by objective (1) of this study.

**Table 4: Post Hoc Comparisons of the Post-Test of MAT Means for the Four**

	(I) Group	(J) Group	Mean Difference (I-J)	p-value
LSD	1	2	9.375*	0.018
		3	0.773	0.769
		4	9.500*	0.016
	2	1	-9.375*	0.018
		3	-8.602*	0.024
		4	0.1250	0.975
	3	1	-0.773	0.769
		2	8.602*	0.024
		4	8.727*	0.022
	4	1	-9.500*	0.016
		2	-0.1250	0.975
		3	-8.727*	0.022

\* - The mean difference is significant at  $p < 0.05$ .

The results in Table 4 show that the pairs of MAT mean scores of Group 1 and 2, 1 and 4, 2 and 3, and 3 and 4 were significantly different at the **0.05** level. However, the mean **scores** of groups 1 and 3, and 2 and 4 were not significantly different. Since the pre-test scores indicated that there was no significant difference between the entry levels of the groups involved in the study, then it was not necessary to confirm the post-test results by performing Analysis of Covariance (ANCOVA). Figure 3 presents the post-test means of MAT.



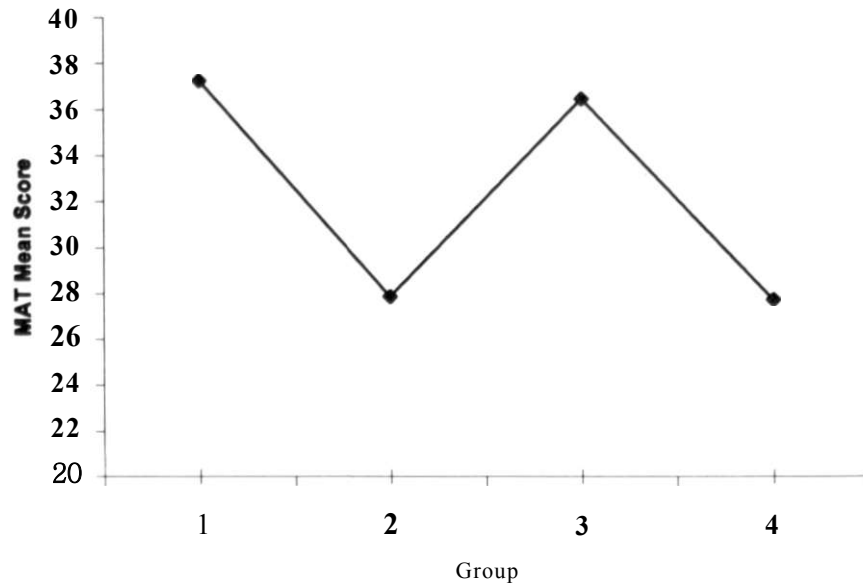


Figure 3: MAT Mean Scores of the Four Groups

**Table 5: A Comparison of Pre-Test, Post-Test Means and Standard Deviation of Scores in MAT**

Group	N	Pre-test mean	Std. Dev	Post-test mean	Sid. Dev
1	44	12.30	11.02	37.27	15.95
2	40	11.20	8.07	27.88	15.06

An examination of Table 5 shows that there was a much higher improvement in the mean score after the introduction of the concept mapping strategy in Group 1 as compared to Group 2, which was taught using the traditional methods. Table 4 reveals that there is a statistically significant difference between the means of Group 1 and Group 2 at  $p < 0.05$  level. This confirmed the earlier observations discussed above and hence the  $H_{01}$  was rejected.

### **Relationship Between Students' Ability to Draw Good Concept Maps and their Conceptualisation**

To investigate the relationship between the students' ability to draw good concept maps and their conceptualisation of '*surds and logarithmic notation*' analysis of the students' scores in the concept maps drawn on 'surds' as the most inclusive concept and their scores in the MAT post-test was carried out Hypothesis H<sub>02</sub> of the study sought to find out whether there is any statistically significant relationship between students' ability to draw good concept maps and their conceptualisation of "*surds and logarithmic notation*". Table 6, shows results of the Pearson's correlation of MAT post-test scores, and the students' scores in drawing the concept maps.

**Table 6: Correlation between Students' Concept Map Drawing Scores and their Post\_test MAT Scores**

Post-test scores (conceptualisation)	N 88	Concept Map scores (ability to draw concept maps) 0.622**
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\*\* Significant at 0.01 level (p<0.001)

Table 9 reveals that the relationship between the ability to draw good concept maps and the conceptualisation of the mathematics topic "*surds and logarithmic notation*" is highly significant, (r = 0.622, p<0.01) Hence H<sub>02</sub> which stated that there is no statistically significant relationship between students' ability to draw good concept maps and their conceptualisation of the mathematics topic "*surds and logarithmic notation*" was rejected.

### **Responses Gives by Students on their Views towards the Appropriateness of the Concept-Mapping Strategy**

A Students' Interview Guide (SIG) was used by the research to obtain students views on various aspects of the concept-mapping strategy. The responses were then categorised into various groups based on similarity and relevance to the interview questions asked. The responses to various questions asked are given in Tables 7, 8 9 and 10.

Table 7: Students' Views on their First Experiences of Learning Mathematics Using the New Method

Response	Frequency	Percent
Was challenging	4	10.0
Made understanding easier	27	67.5
Was confusing and complicated.	9	22.5
<b>Total</b>	<b>40</b>	<b>100.0</b>

Table 8: Students' Suggestions on What the Teacher should do to Enhance Learning of Mathematics Using the New Method (Concept Mapping Strategy)

Response	Frequency	Percent
Give more exercises in the use of the method	28	70.0
Take more time to explain the method		27.5
Should make us draw maps in groups more often	1	2.5
<b>Total</b>	<b>40</b>	<b>100</b>

11

Table 9: Students' Views on the Impact of the New Method on the Learning of Mathematics

Response	Frequency	Percent
Was good & interesting	36.	90.0
Was complicated	4	10.0
<b>Total</b>	<b>40</b>	<b>100.0</b>

Table 10: Students' Views on the Merits and Demerits of Learning Mathematics Using the New Method as Compared to the Traditional Methods

Response	Frequency	Percent
Was quite helpful in understanding of difficult concepts	39	97.5
Was not helpful: infact it was very confusing	1	2.5
<b>Total</b>	<b>40</b>	<b>100.0</b>

All these responses outlined in Tables 7, 8, 9, and 10 clearly show that the students found learning mathematics using this method to enhanced their understanding of concepts. When asked whether they would like to be taught the other subjects in

school using the concept mapping teaching strategy, 40 out of the 40 students answered in the affirmative.

The teachers who handled the treatment groups (groups 1 and 3) observed that the concept-mapping teaching strategy was quite useful in relating various concepts during the course of teaching the topic "*surds and logarithmic notation*". They suggested that this strategy should be introduced to them in college and that teachers should use it more often in teaching mathematics and other subjects. They were also quick to point out that the method was time consuming and hence could interfere with the timely coverage of the secondary school mathematics syllabus. In general, they were very happy to use the new method and suggested that the use of the concept mapping strategy as both a teaching and revision tool be given more prominence.

## **Discussion**

### ***The Effects of Concept Mapping Strategy on Students' Conceptualisation***

The results obtained in this study show that there is a statistically significant difference at  $\alpha = 0.05$  between the conceptualisation of mathematical concepts by students who were taught using the concept mapping strategy and those who were taught using other traditional teaching methods. This shows that those using the concept-mapping strategy performed much better than their counterparts. Hence, the concept mapping teaching strategy leads to higher students' conceptualisation of mathematical concepts. These findings are similar to previous findings made by eighteen studies, which examined some aspects of students learning and achievement with concept mapping as a study tool (Trowbridge & Wandersee 1996; Esiobu & Soyibo 1995; Trowbridge & Wandersee 1994; Okebukola 1992a). Seventeen of the eighteen studies reported significantly positive results in favour of the concept-mapping students. Seven of these studies were conducted in biology classes (Hegarty - Hazel & Prosser 1991; Okebukola 1990; Jegede *et al.*, 1990), especially in the areas of genetics, ecology and evolution.

In other four similar concept mapping studies in chemistry (Fransisco, Nicoll, & Trautmann, 1998; Markow & Lonning, 1998; Wilson 1996; Stensvold & Wilson, 1990) which examined the effects of concept mapping on learning within several subtopics in both chemistry lecture and laboratory, their findings agreed with the findings of this study that concept mapping strategy enhances conceptualisation. Three international papers from Australia, Arabia and Israel, respectively which examined overall science learning with concept mapping (Wilkes *et al.*, 1999; Elhelou 1997; Barenholz & Tamir 1992) also gave similar findings to those got in these studies

The results got after analysing the responses given during interviews taken by the students in "the groups taught using the concept mapping strategy indicated that **majority** of the students found the new method quite helpful in understanding the **content** clearly and also in recalling learnt concepts (Tables 10-13). These findings **agree** with previous findings in California in the United States of America by **Moreira** (1996), which suggested that concept-mapping enables the engagement of **learners** in thinking while learning, besides putting the students in control of their own learning. Similarly, Amer (1994) found that Egyptian Students using concept-mapping to study science in English, wrote significantly better summaries than both an experimental group that underlined text and a control group with no specified study method. Therefore, when students engage in the activity of mapping knowledge, and more specifically concept mapping, they generally tend to team more and reflect more upon their own learning than is the case with other study methods.

### **Relationship between the Ability to Draw Good Concept Maps and onceptualisation**

The ability to draw good concept maps was indicated by the scores got by learners in a concept map on "*surds*" as the most inclusive concept. A high score implied that the student drew a concept-map which was detailed and valid. The learners' scores in MAT indicated the level of conceptualisation. The higher the score, the higher the level of conceptualisation of the topic "*surds and logarithmic notations*". The results in this study indicated that the relationship between the students' ability to draw good concept maps and the conceptualisation of the topic "Surds and logarithmic notation" is strong and statistically significant at  $\alpha = 0.05$  level. This indicates that the better the students are at drawing concept maps in a given topic in mathematics, the higher their level of conceptualisation of the same.

This confirms previous findings in New York in the United States of America where positive results were seen in studies in which students engaged in semantic networking as a means of mathematics and science learning (Gorodetsky & Fisher 1996). The findings also relate to those of several other studies by Jay, Alldredge & Peters (1990) and Christianson & Fisher (1999) ranging from 7<sup>th</sup> grade to college level, conducted in Boston in the United States of America which found that biology students using semantic networking learned more declarative knowledge and learned the topics, more deeply than comparison groups.

Gordon and Gill (1989), in a similar study conducted in Moscow (they looked at two topics; use of mathematical vectors and use of video cassette recorders) observed that when students have well-organised declarative knowledge about a topic they are able to perform relevant problem-solving procedures. Furthermore, by identifying gaps in the students' declarative knowledge, Gordon and Gill (1989) were able to predict the individual students' performance errors with 85% and 93% accuracy, respectively.

The findings made in this study on effects of concept mapping strategy on students' conceptualisation of "*surds and logarithmic notation*" are further discussed in chapter 5. They agree with the findings of most other studies mentioned in this chapter which suggest that the construction of knowledge representation is likely to have a positive influence not only on acquisition of declarative knowledge but also on performance related to that knowledge base.

## **Conclusions and Recommendations**

### **Conclusions**

Based on the results of this study, the following conclusions have been reached: - Concept mapping strategy produced a statistically significant effect on students' conceptualisation of mathematical concepts. Students who learnt the mathematics topic "*surds and logarithmic notation*" using the concept mapping strategy attained better mean scores in MAT than the students who learnt under the traditional teaching methods. There is a statistically significant relationship between students' ability to draw good concept maps and their conceptualisation of mathematical concepts. Students who scored highly the concept map on 'surds' as the most inclusive concept also scored very highly the MAT. There was a very high correlation between the two scores.

Majority of the students who were taught the topic "*surds and logarithmic notation*" using the concept mapping strategy found it quite helpful in assisting them to relate concepts and also in understanding them with ease. Most teachers in secondary schools are not familiar with the concept-mapping teaching strategy. Demands on teachers in secondary school mathematics who use concept mapping teaching strategy include pressure to complete the syllabus within the stipulated time, allocation of sufficient time for preparation and learning, and need for a deeper background knowledge of the subject.

The concept-mapping teaching strategy results in higher students' conceptualisation and thus should be used more often in mathematics teaching at secondary school level. When this method is used, the learners are more enthusiastic about learning mathematical concepts and they are able to relate concepts with ease. The concept-mapping strategy is therefore likely to assist the teachers to more efficiently prepare their students. This may reverse the current trend in mathematics performance at KCSE and bring about an improvement in its performance. This will enhance the possibilities for the learners taking up career opportunities in the areas of Science and Technology where a good pass in mathematics at KCSE is always a pre-requisite.

In spite of the merits associated with the concept-mapping teaching strategy, the mathematics teachers know very little about it. This implies that the method is rarely used and if it is used in some schools then its numerous advantages are never

realised. Therefore, the Schools Inspectorate Department in its efforts to make teachers more effective should encourage mathematics teachers to use the concept mapping teaching strategy and where necessary they should have clinics on how to effectively use the method. Institution concerned with the training of teacher such as Universities and Teacher-Training colleges should make concept mapping teaching strategy part of the content covered during training.

## **Recommendations**

Based on the findings of this study, the following recommendations were made:

- (i) The concept-mapping strategy should be adopted as a teaching method. This can be achieved by in-servicing the mathematics teachers on how to adequately use the method.
- (ii) Concept-mapping techniques should be used in the writing of some mathematics content in mathematics textbooks in order to enable the authors to simplify and show relationships between various concepts that learners sometimes find difficult to understand.
- (iii) Students should be encouraged to use the concept-mapping strategy during revision. This will go along way in the reconstruction and improvement of their prepositional framework.
- (iv) The concept-mapping teaching strategy should be incorporated in the content of teacher training programmes in both the Teacher Training Colleges and Undergraduate level at the University. It should not only be introduced to them at the Master of Education Degree level.
- (v) The Ministry of Education should improve the quality of seminars and workshops where methods of improving the learning and teaching of mathematics for example the use of concept mapping strategy are discussed. This will give the teachers an opportunity to share their experiences and improve on their effectiveness in the teaching of mathematics after they have graduated from Teacher-Training Institutions.

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**A CRITICAL EXAMINATION OF THE ASPECTS  
OF INDIGENOUS EDUCATION ON  
ENVIRONMENTAL MANAGEMENT AS  
PRACTISED BY MAU OGIEK OF KENYA**

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**Abstract**

This paper presents the relationship and interactions within the Ogiek indigenous knowledge systems of environmental protection and utilisation, in Mau Forest of Kenya. Specifically, it focuses on the educational approaches that the Mau Ogiek have used over time, to ensure a sustained and balanced co-existence of the people and their environment. The study employed an ethno-historical approach in its design, instrumentation, data collection, interpretation and analysis and it was guided by both the General Systems Theory and the Cultural Ecology. To achieve a systematic collection of data, snowball and purposive sampling techniques were used. In addition to oral interviews, the research paper used documentary (primary and secondary) sources. The study was qualitative in nature as it sought to examine the aspects of Ogiek indigenous education that have enabled the community to sustain and manage environmental resources. The information obtained was checked for validity and reliability using triangulation as well as external and internal criticism approaches to data analysis. The results reveal that the Ogiek had two primary methods of education: initiation and apprenticeship. Girls and boys were initiated at puberty during the pre-colonial times. They also undertook apprenticeships to learn skills of hunting, bee-keeping, herbal medicine, pottery and cloth-making. During both initiation and apprenticeship, environmental conservation was taught. It is hoped that the research findings will be useful to policy-makers in such fields as education and environmental conservation on the need for the integration of indigenous knowledge systems into modern environmental management strategies.

**Introduction**

The Ogiek are regarded as the aboriginal inhabitants of Eastern Africa together with the Boni, Sanye, Asa, Elmolo, Sengwer, Njemps and Watta of Ethiopia (Blackburn 1976). They are the largest group among the forest dwellers in Kenya, numbering about 20,000 people and are officially referred to as the 'Dorobo' (Sutton 1976 and Towett 2004). The Ogiek practised hunting and honey-gathering economy as a mode of subsistence. The Ogiek have had distinctive histories of interaction with the natural environment (Yeoman 1979). Mau Forest, the home of

the Ogiek people, is located in the Rift Valley Province and straddles four districts: Kericho, Nakuru, Narok and Bomet (Kenya Forest Master Plan 1995). The forest covers an area of 900 km<sup>2</sup> (Wass 1992).

Maintaining and conserving environmental resources in most parts of the world presents a daunting challenge due to the ever-increasing population. In Kenya, environmental degradation has occurred at an alarming rate in such areas as the Mau Forest, the home of the Ogiek. This has been largely due to the intrusion of farming communities in the area and the influx of commercial timber harvesting companies. This process of degradation culminated in the degusting of parts of the Mau forest in 1992. The Mau Ogiek of Kenya present an example in which humans have both protected and utilised environmental resources.

This community has managed to survive without causing significant environmental degradation using an approach that has for a long time ensured co-existence of the people and nature. It is possible that their indigenous knowledge systems (as embodied in their indigenous education) are key to understanding environmental sustainability. This study sought to investigate the influence of Ogiek Indigenous education on environmental conservation with a view to establishing how indigenous knowledge could be incorporated into modern environmental management strategies.

The recent encroachment by farming communities and commercial timber harvesting companies represent a serious threat to the very existence of this vulnerable and marginalised group, whose approach to environmental resource utilisation has ensured a continued and steady supply of their basic needs. It is imperative to note in this paper that indigenous education is necessary in the quest for alternative approaches to the promotion of desired learning to supplement western education in the enhancement of modern environmental management and consciousness.

## **Methodology**

The study employed an ethno-historical approach in its design. The research sample was drawn from two sites in the Mau forest namely; Western and Eastern Mau, where the majority of the Ogiek reside (Towett 2004). The selection of the informants was done after a pilot survey of the whole of Mau Forest. To ensure comprehensive data collection, the selection of the informants was done using snowball and purposive sampling techniques to identify key cultural consultants (Dalen 1979; Babbie 1996; Cohen 1994; Gall 2003). Informants who were interviewed included religious and ritual experts, herbalists, scholars, and those who were skilled in hunting, bee-keeping and other traditional skills.

Individual oral interviews were carried out during the year 2001 with 50 elderly men and women. The interviews systematically covered social, economic, political, cultural and religious aspects within a general historical framework. The main

instruments that were used to collect data were observation and an interview schedules. The items in the instruments were designed in such a way that they were relevant to each of the group of informants mentioned above and were ultimately useful in achieving the research objectives of the study. Open-ended questions were used to allow informants to express their experiences in their own terms.

The author carried out interviews with the assistance of an interpreter. Interviews were taped and then transcribed. In addition to oral interviews, the research paper utilised documentary (primary and secondary) sources. The information obtained was checked for validity and reliability using triangulation as well as external and internal criticism of data analysis. While analysing the data, Gay and Airasian's (2003:229) four steps (Memoing [reading], describing, classifying and interpreting) in the integration of qualitative model were extensively employed.

## Results and Discussion

### Social Structure, Initiation, Land Tenure System and Ecological Management

The Ogiek held their land collectively while individual community members enjoyed subsidiary right of use and occupancy although these indigenous lands were neither demarcated nor otherwise specifically recognized by the Kenyan laws (Kuloba & Oguk 1999; Okoko 2003 and Toweett, 2004). According to Blackburn (1976), the lineage was seen as the principal social institution of the Mau Ogiek, responsible for giving girls in marriage, negotiating and paying compensation in legal cases. The lineage is the land-holding unit as well as the unit of residence. On the other hand, Huntingford (1951) who studied the early history of the Ogiek on the edge of Tindiret forest found out that the clan ('Oret') was the most fundamental social unit. The Ogiek people therefore identify themselves not only as Ogiek but also by their local group affiliation (Blackburn 1986: 61-82).

In the context of this paper, a clan refers to a group of people united by the belief in descent from a common ancestor; several lineages make a clan. The most predominant clans among the Ogiek include; 'Kipasisek', 'Kipcheromek' and 'Kimeitek' (Hobley 1953; Kratz 1993; Towett 2004). They were considered to be stable since they lived in harmony with their neighbouring clans and people. Indeed, various clans regulated the conservation of the forest by ensuring that none of their members felled trees irresponsibly.

The exploitation of the natural resources had clear checks and balances thus allowing indigenous environmental sustainability. Certain trees, for instance, 'Simotwet' were conserved mainly to be used during initiation ceremonies (Barkosiach 2001). The lineage council of elders taught the community members and instructed them on the issues of environmental management for sustainable development.

The Ogiek had a system of managing the forests through their lineage system. (Wass 1995: 10-22). They allocated blocks of forests to clans to use. The forest areas or territories ('*Konoituek*') were first occupied by the clan, which divided it according to the family tree (Blackburn 1976, 1986). They sub-divided the forest among their clans using natural features like rivers, valleys or hills as boundaries recognized according to their customary land tenure system (Yeoman 1976: Kratz 1986 & Kratz 2000).

Likewise, they determined the ownership of '*Konoito*' (singular of *Konoituek*) by identifying the dominant clan in the region. Furthermore, the Ogiek could also allocate a zone to a given clan by observing certain types of trees valued by the clan (Mwanzi 1977; Kratz 2000 & Torongei 2001). The ownership of these territories ('*Konoituek*') entailed the right of a lineage to use the forest for the purpose of collecting honey.

Each family gave a name to their part of the forest for identification and awareness of other families and customary respect for boundaries (Hobley 1953 & Barkosiach 2001). Indeed, the Ogiek land tenure system aimed at defusing feuds resulting from conflict over hunting and bee-keeping rights. Essentially, it was the responsibility of the elders to ensure that the resources were used in the right way and knowledge was passed on to the young generations regarding conservation of natural resource base. Therefore, division of '*Konoituek*' among the various clans assisted in the conservation of the forest because some clans could exploit the natural resources without conserving it for future use (Klamp & Kratz 1993). Likewise, community members protected the streams and rivers by ensuring that no cultivation was done within a specified distance from both sides of the rivers (Ottenberg 1960:33;).

The Ogiek had no chiefs or headmen but rather relied heavily on lineage councils to handle social problems (Bargochut 2001). At the lineage level the elders taught the youth how to live and work together. Above all, they learnt that one could not live alone; and that, consequently, the group which made life possible demanded conformity to its manners, obedience to its laws, services to its defence and the propagation of children for its perpetuation. They were also taught decency of speech and behavior in the community at large (Chepchilat 2001; Tenai 2001). Indeed, the philosophy of functionalism really applied at the lineage setting in which children and the youth learnt what was of utility to them; likewise, the learning imparted was geared towards preparing them for their adult roles as men and women.

Furthermore, at the lineage level, all kinds of subjects were discussed by the lineage council of elders, particularly those touching on the regulation of social conduct in the land. All elders of a lineage could be present to watch and take part in the discussions as they saw it fit. In these social groupings, the youth were taught about their natural environment. They learned which kinds of grasses were suitable for which purpose and the work had to be done to obtain food by joining

with elders in this work. They were also oriented to learn the family, clan and community history and their relationships with other communities through stories told by the elders (KNA 1925). In all these regular undertakings, every adult was a teacher in an informal sense to a greater or lesser extent.

### ***Initiation, Age-set System and Induction into their Social Norms***

The Ogiek ceremonies of initiation integrated some elements of both Maasai and Kipsigis practice, although they did not rival the elaborateness of that of either community (Kratz 1993). The period of initiation was the most important time in the life of the Ogiek - both for the individual initiate and for the whole community. The rite of initiation for both sexes signified a distinct period of formal teaching and examining, with specially selected and experienced elders giving instruction and setting tests. It was deliberately made an emotional and painful experience, and sometimes covered a period of many months; it consequently would be engraved forever on the personality of the initiates (Mosonik 2001; Ronoh 2005).

In the last few days before initiation, the candidates gathered in the evenings at each other's homes to practise the initiation songs to be sung on the night before the operation. In these songs, boys and girls were reminded to heed the advice and instructions given by their seniors (Sang 2001). During the penultimate day of ceremony, the candidates got up early and gathered at one of the homes. They then went off to collect the sacred plants '*korosek*' and '*sinendoik*' to be used that evening (Ntoror 2001; Rop 2001; Ronoh 2000).

On the day of circumcision, they were stung with thistles as a test of their courage. The actual operation began at about seven o'clock for the girl initiates; but for the boys it took place as early as five o'clock. Boys were circumcised in their individual '*menjo*' huts. However, the girls' rite was performed in one central place - usually outside the home of a well-off person. The actual circumcision consisted in the cutting off of the boy's foreskin and cutting off of the clitoris for the girls. The girls were led away to the various homesteads where they would be put in seclusion. The moment also took a form of an emotional and dramatic event, culminating in the reunion by the lineages and close relatives on the way. This stage marked the test of the initiate's bravery.

Immediately after this, the elders began to teach the candidates the rules of behaviour pertaining to the whole period of seclusion. The initiates were taught to be obedient throughout this period, to listen to all instructions carefully and to make no complaints even when they were mistreated (Ronoh 2000). During their prolonged period of seclusion, the instructions imparted to the two sexes differed in methodology and curriculum, and this was because they were being trained to play different roles in society. For instance, boys were given instruction pertaining to military techniques and skills. The boy initiates had to know their genealogy and their exact position in the lineage so that they might be able to claim their appropriate seniority rights later on (Daniels 1970 49-60).



Further, they were also secluded in a state of limited mobility in which they practised the physical skills of manhood (Kratz 1991, 1995, 1999). These included making bows and arrows, walking sticks and similar wooden articles for shooting birds (Ronoh 2005). Later on, they were eventually allowed to handle and given tools and weapons such as a machete, a knife, an axe, arrows, spears etc. Indeed, they were taught how to use them appropriately both for domestic and military purposes. The Ogiek have never been exempted from intra-ethnic conflicts and, indeed, conceived of their initiated young men ('*muranik*') as their first line of defence against feuding between lineages, and during cattle raiding as well as when fighting with other local groups notably, the Sirikwa, Maasai and Kipsigis (Yeoman 1979; Kratz 1993; Toweett 2004).

The Ogiek of Mau have an age-set system; the age sets cut across kinship ties and were the basis for important social bonds. These age-based groups were made up of only males and had military and political functions. Women and girls did not belong to any age-set, but were identified with the age set of their spouses after being married. Thus, a newly initiated age-set would normally form the 'standing' army which had the task of defending the people of the Ogiek community from external aggression. Moreover, the age-set system gave support for and recognition of peer group relations among those men who had grown up together as friends, sharing the pleasurable activities of hunting, raiding, dancing, honey collecting and any other form of socialisation (KNA 1932). The members of the oldest living age-set were considered as being the connecting link between the living and the spirits of the dead. The warriors carried out such raids as the elders might have decided on.

The male initiation included a test of their skill as hunters (Chesang 1973; Ehret 1974; Mwanzi 1977; Ronoh 2000). They learnt about the application of medicines to assist them in the hunt, as well as initiation dances. Forest conservation measures were also inculcated on to the initiate's curriculum during this stage. For instance, they were instructed to protect the important tree species like '*Rombeya goetzeni*', '*Olea euro*', and '*Olea hochstetteri*', which were used for herbs and honey (Wass 1995:10-22). Subsequently, they were warned of the problems that they would encounter when the environment was degraded.

### ***Apprenticeship Schemes of Hunting Economy***

The Ogiek lived in small isolated settlements inside the dense, high-altitude evergreen forest; their permanent home and wet-weather hunting ground. **They** depended for their food on hunting and to a lesser extent on gathering for their food. Hunting was an important and integral part of the Ogiek pre-colonial economy and diet (Ronoh 2005).

The Ogiek hunted in groups. There were clear regulations governing the hunting economy. The Ogiek, being skilful forest hunters and nomads, built temporary huts

in the forest depths and kept to their lineage grouping (Blackburn 1982:31). Each clan had a strip of forest covering about 80 hectares and bounded by streams and ridge tops. Indeed, richer clans had two of such hunting grounds (Pritchard 1969:72). Thus, each lineage had their own section of the forest where they hunted and set traps. Trespassers were killed by the members of the other territory for engaging in hunting within their ridge.

When an individual was chasing an animal and it fled into another ridge, then the hunter had to abandon the activity. However, when the animal had crossed into the other side, people from that ridge were informed so that they would continue hunting for it. Those involved on both sides would ultimately share the meat (Rop 2001). The Ogiek of Kenya and Northern Tanzania were celebrated specialised hunters who used a variety of techniques, different clans favouring different hunting methods.

They hunted the full range of game with pit fall, weighted spears, traps, snares, and bows and arrows as well as throwing sticks - although these techniques were later prohibited by the colonial government, being seen as dangerous to humans. (Mackenzi 1993:54-85). They were famous for digging game pits along the fringes of the forest. The common custom was to dig the pit close to where a trunk of a tree had fallen across the path (Were 1978:4; Blackburns 1982; Kratz 2000). Grass or twigs then concealed the pit. They could also organize large hunting expeditions masterminded by the newly initiated *muranik* at lineage level.

**D**uring the dry season, the Ogiek hunted outside the forest in the vast grasslands where the game grazed. They were sometimes set upon by the hunters and herders (warriors) of the other ethnic groups who did not like competition (Chepchilat 2001; Kipnai 2001). Whenever this happened, the Ogiek had a reputation for being able to disappear into the forest. While hunting in the nearby plains, the Ogiek could see and stalk animals before the animals knew they were there. The plains also provided a clear means of escape if one of the large dangerous animals charged (Blackburn 1982).

In contrast, it was quite impossible to hunt an animal before it would flee in a dense forest, for this reason, forest hunting required the use of dogs. The dogs chased the animals and brought them to bay so that they could be speared by the hunters. Giant forest hogs and bush pigs were frequently killed in that manner (Blackburn 1982; Kratz 1995; 1999:220-224). Without dogs, perhaps the Ogiek would not be able to live in the forest at all. On the one hand, hunting had a high prestige value among the Ogiek especially when it was done communally but, on the other hand, it was simply seen as a method of survival pursued by individuals at the family level. On the whole, hunting became closely bound up with the Ogiek ceremonial activities and its intricate rites of passage. For instance, every hunter erected an 'altar' that was dedicated to the success of his hunting expeditions and some of the vertebrae or horns of the different kinds of animals could be seen when one entered their homesteads.

The Ogiek also believed that particular parts of certain animals, when eaten, conveyed virtues of courage while other parts were thought of as providing special curative powers. In this way, hunting provided an ontological framework to the Ogiek's superstructure. Indeed some clans were even very selective in the parts of an animal that they were supposed to eat. This was because of the existence of many totemic taboos that forbade the consumption of specific animals or parts of an animal. Hence the social relations and ritualistic powers associated with the Ogiek hunting economy were complex (Ottenberg 1960; Sutton 1976; Blackburn 1976). Because of this, the Ogiek selectively hunted those animals in the Mau Forest complex that were not endangered; such as' warthogs and tree hyraxes. These animals were hunted for food, and not for sport.

Once they had obtained meat through hunting, the Ogiek dried it for future use by the lineage members. Since meat could be salted and dried it could be kept for long periods. In this study, game meat was observed to have been a more important component of the Ogiek's diet than many anthropologists and ethnographers have observed (Elliot 1905: 138-144; Meinertzhagen 1957:111; Mackenzi 1993:15). To the Ogiek, hunting had a much wider significance than simply the supply of food. Hunting also stimulated crafts and local trade in the manufacture of weapons, nets, snares and poisons.

The Ogiek manufactured poisoned arrows particularly prized for their speed of action, often selling them at a great profit to the neighbouring Kipsigis and Nandi people (Blackburn 1982:16). Animal products were in turn manufactured into clothing, ornamentation, receptacles, musical instruments and symbolic or magical items. Boni hunters who lived along the River Tana and the Akamba of Kenya bought poison arrows either directly or indirectly from the Ogiek of Mau Forest. The Ogiek, as specialised hunters, maintained symbiotic relationships with neighbouring cultivators (Kipsigis) and herders (Maasai), although these two groups also hunted to a limited extent (Barkosiach 2001). Other communities sometimes hunted as a pastime for additional meat but for the Ogiek game is their prime source of food apart from honey. They always talk about wildlife, as it is their first interest in life.

Hunting was not only the product of necessity, but also a preference involving excitement, romance, recreation, transition and training. The importance of hunting to the Ogiek pre-colonial economy may lie precisely in its range from its humble beginning as a survival mechanism for individuals and various lineages to a communal pursuit laden with rituals and politics as well as socio-economic significance (Blackburn 1976). The Ogiek hunters are declining as fresh demands are made on their hunting grounds. Many have been forced to take to sedentary settlement to avoid conflict with government policies and other forces of change. Recently, the Ogiek have rapidly cut back on their hunting and focused more on rearing sheep and goats as well as growing food such as beans, maize, potatoes and

**cabbages.** They have also ventured into growing cash crops such as pyrethrum and tea.

### ***Bee-keeping Economy***

The Ogiek are a honey-gathering community who mainly farm bees in the Mau forest along the western part of the escarpment of the Great Rift Valley in Molo South (Western Mau) and also in the eastern part of the escarpment. For all Ogiek, bee keeping and collecting honey remain central to their way of life. It is the most important activity among them, not being the main source of food, but being a powerful symbol in their culture. We could also infer from R.H. Blackburn's study that the Ogiek display a "honey complex" analogous to the "cattle complex" of the East African pastoral tribes such as the Maasai and the Nuer of Sudan (Blackburn 1982:18).

As was the case with hunting economy, there were also strict regulations governing the bee-keeping economy. More precisely, nobody was supposed to cross their own ridge and make a beehive in the other territory. If an interloper was discovered the other beekeepers could curse him. Worst of all was the fact that if anybody stole a beehive from one zone and took it to another zone, he had to seek forgiveness or else a curse could be administered upon him by the Ogiek ritual experts from among the affected lineages (Chepkwony 2001).

The Ogiek made different artefacts for use in collecting and storing honey; the most important being a beehive (*moinget*). Boys learnt from their fathers how to make this important vessel. Only the experienced elders were allowed to make beehives from certain trees; the bark used to make such beehives was removed in a particular way so as to conserve the tree as well. The most commonly used tree for this purpose was *Juniperus procera* *lia*. *Rombeya goetzeni* *olea euro* and *hochstetteri* were also used for honey preparation and harvesting (Wass 1995:10-22). The making of this vessel (*moinget*) took an experienced person a whole day to chop down a tree, cut it into sections, split each in half and hollow out the inside before putting it back together in readiness of taking it to the nearby forest for use (Blackburn 1982:14).

Collection of honey from the hive was a task that required strength, care and bravery when the angry bees tried to protect their honey. Indeed, the collectors had to reach the top of a tree whose trunk was mostly bare. Many of the honey collectors designed various methods and ways of climbing. For instance, some tied a series of vine loops round the trunk to form a ladder, while others cut a long sapling pole and hooked it onto the lowest strong branch. Either way, before they climbed to the top of a tree, smoke 'smudge' had to be made to drive the bees out of the hive or making them less active (Blackburn 1982; Chebor 2001). During this process of honey collection, the collectors made sure that they had left enough combs in the hive to encourage the bees to remain and hence make more honey.

The Ogiek used to regard honey with deep reverence and its supply was protected by numerous taboos. For instance, after eating honey, the Ogiek carefully rubbed their hands with earth justifying their selfishness. The uses and significance of honey to the Ogiek exceeded those of any other commodity (Blackburn 1971). Honey was used as a curative product (Kratz 2000). Indeed, extracts from roots and barks of specific trees were boiled and the soup was then mixed with honey (*nuriek*), which had already been added to water. The boiled mixture would then be given to the patient. It was found to cure so many types of diseases (Marindany 2001). Honey was also used as food and it was consumed by members of the lineages together with some wild vegetables, for instance *siek* (Kipnai 2001). Honey was often used as an agent in meat preservation. Meat was steeped in honey for some time and later hung from the ceiling to dry.

An innovative use of honey was by making brews called '*Kipketinik*' (Blackburn 1983:16). The beer-making process took one to two days. Women in most cases were bestowed with this responsibility but on very rare occasions men assisted them. For a start, honey was placed with water in a large bag and set beside the all-night fire to be kept warm. Certain plants, stems and seedpods were added to aid the process of converting much of the sugar in the honey to alcohol (Rop 2001; Soy 2001). Only the adults were permitted to take this refreshing drink. Ideally, beer drinking provided the lineage with an opportunity to focus on communal life as reflected, *inter alia*, in their initiation ceremonies, dances and hunting expeditions. During these beer parties, the elders would advise the young and especially the warriors on varied issues pertaining to their behaviour within their lineages (KNA 1902). All kinds of subjects were discussed, particularly those touching on the regulations of social conduct in the land. In this way, they were taught to realize all their potentials-physical, intellectual, moral and spiritual- in a balanced and integrated way.

Remnants of honey were kept in larger containers or pots for future use. Sometimes, part of this honey could then be traded with neighboring peoples living outside the forest. They exchanged honey with the Nandi and Kipsigis farming and herding communities respectively in return for such products as iron knives and axes, pottery and tobacco (KNA 1944). Simon and Phoebe Ottenberg (1960) contended that, with the exception of their economic exchange, the Ogiek and the Nandi maintained complete independence of each other.

Recently, the Ogiek have claimed that pyrethrum and pesticides applied on their farms kill bees and have rendered bee keeping unviable. To them, this is not therefore a suitable alternative to harvesting of wild honey in the forest. Thus, they have been against modern scientific methods of farming as they interfered with their more cherished economic activity.

### ***Herbal Medicine and other Apprenticeships***

Herbal medicine was widely practised by the Ogiek in pre-colonial times. It was commonly practised by specialists as '*Chepsogoinik*'. Every Ogiek man and woman was a herbalist to a greater or lesser extent (Toweett 1979: 40-41). When children were sick or ill, the mother was responsible for giving advice and first aid before the father's assistance was resorted to. The first aid involved the fetching of different types of curative leaves, roots or even juices of particular trees. Men and women learnt this skill from their parents.

With time, the girls were also taught by their mothers to collect medicinal herbs from the forest. In the initial stages, they would accompany their mothers to the forest to learn the right. Honey was also used as one of the curative products, as described above. Even so, there were individuals who were recognized as better herbalists who had trained in the art of medicine and came from specific clans. Such clans trained their young men and sometimes women in the profession (Birir 2001 and Barkosiah 2001).

When the disease or sickness proved more complicated, the recognized herbalists were sought out. Most of them kept ready stocks of well-known herbs for the treatment of ailments and common complaints. They kept trying new herbs and mixtures for the treatment of new diseases (Toweett 1979:42). Such specialists also learnt how to conduct witchcraft (Maina 2001).

The few who practiced witchcraft did this in secret and supposedly even trained their children in the act. When discovered, a suspected witch was driven out of his or her own home to live with their maternal uncles. Those who persistently practised witchcraft were executed by a form of strangling (Ronoh 2000). Some individuals were specialized in exorcising witchcraft; these were very rare people among the Ogiek, and they passed on their skills to their offspring. But in some circumstances where an individual was not related in any way to the specialist (if not from the same clan), the apprenticeship could take place if the apprentice paid compensation. In most instances, if not otherwise stipulated, a sheep was acceptable (Chumo 2001).

Herbal medicine aided the conservation of the environment because only the specialists were allowed to extract the herbs from the forests and they were entirely guided within the framework of their code of ethics governing their profession (Kimisoi 2001). Though they exploited the environment, they were cognisant of the plants' sustainability. Trees of medicinal value were conserved and it was the responsibility of the individual member and the lineages in general to monitor their growth and development. Likewise, during the various rites of passage, the young were taught the importance and ultimately the fundamental rights attached to these specified trees and hence the society treated them as sacred. They universally guarded them from being destroyed by loggers and members of other ethnic

groups. Herbalists in general could fell trees as a way of obtaining or collecting herbs. Indeed, they had in mind the concept of tomorrow and wanted to ensure adequate and steady supply of herbs thus reinforcing the perpetuation of their profession.

Iron-working was a major economic activity, similarly learnt through apprenticeship. It was practised by a cross-section of professionals in the field who later trained their children in knowledge of this technology. The knowledge was transmitted from father to the son, especially among the hunting bands, and thus developed over the generations within the patrilineage (Ronoh 2000). These specialists made all kinds of implements- including hoes, knives and axes and weapons such as spears and arrows. Blacksmiths specialised in the making of different types of tools. While skills and techniques were thus passed on, the arrangements were far from rigid.

A son who had no natural bent for his father's craft might learn another trade from a paternal uncle or even from a non- relative. Those interested from outside a particular clan could also be given the relevant instructions. For this, the specialists were paid for instance with a goat, a sheep or a cow. Weaving was practised by women and taught to the girls. The skills a girl obtained depended largely on her personal interest in the skills practised by her older sisters, mother or grandmother (Brown & Hiskett 1975; Toweett 1979). The girl would learn techniques through observation. The older sisters spent some time with the younger ones giving instruction on how to make clothing. Learning was also transmitted through examining the finished items.

After marriage, a woman's profession could change to fit the arrangement of her new household. For example, she could seek to be skillful in making pottery using clay from the local soil. Women made pots of various designs and sizes to suit all purposes (Kratz 2000). The girls learned the skills through observation of their mothers at their work. Every mother specializing in pottery would lead her young daughter to the field, where clay was obtained.

In the field the girls were taught which type of clay was suitable for their work (Blackburn 1982). The knowledge imparted here was practical. In general, pots were made to order, with anybody needing a pot being able to instruct the potter as to which design and size was required. The art was practised mostly by the section of Ogiek women who were the immediate neighbors of the Kipsigis and the Abagusii (Rop 2001).

The Ogiek people have a long history of resistance and struggle that has sustained their identity and cultural distinction. Since time immemorial, the Ogiek have been living in Mau Forest depending on the forest for subsistence and shelter. They have always relied on forests as a source of livelihood. They still strongly believe that they have a right to live in what they consider to be their ancestral home.

Essentially, the forest resources played an important role in Ogiek culture rendering their conservation vital. Thus, whenever they moved into the forest, they used their indigenous education to conserve it. The elders passed on their conservation measures to the community during the period of initiation and during apprenticeships. With the advent of Christianity, Western education and other cultural changes, including those brought by intermarriage, the indigenous methods of environmental conservation and education have been threatened on all fronts. In spite of these emerging issues, the Ogiek have managed to create an elaborate and complex co-existence with natural environment. Indeed, their apprenticeship schemes are being integrated into modern and scientific and technological innovations.

### **Recommendations**

Environmental degradation of Mau Forest can be attributed almost exclusively to external forces beyond the Ogiek's influence. The Ogiek have all along strongly advocated for the conservation of forests in Mau Highlands. Thus, they should be involved in the decision-making process regarding forest management and utilisation. They are among the stakeholders and direct beneficiaries of the success of the intervention measures. Moreover, they have demonstrated the success of their traditional forest management knowledge, which should be incorporated into contemporary forest management. Hence, traditional conservation should be taught in Kenyan schools.

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## CHAPTER 10

# EFFECT OF A SOCIALISED MATHEMATICAL LANGUAGE MODULE ON STUDENTS' UNDERSTANDING OF MATHEMATICS AND THEIR PERCEPTION OF THE LEARNING ENVIRONMENT

*Dancun Wasike Wekesa and Helen Omondi Mondoh*

### **Abstract**

There is evidence that students have problems in understanding and interrelating symbols and special language structure as used in mathematics. The study or which the paper is based was designed to develop and explore the instructional potential of a Socialised Mathematical Language (SML) module in teaching and learning of statistics in mathematics. A quasi-experimental approach adapted from the Solomon Four Group Experimental Design was employed to compare experimental and control groups drawn from schools in Bungoma district. Four different instruments namely achievement test, students' questionnaire, teachers' questionnaire and observation schedule were used to collect data from 156 Form Two students selected for the study. Both descriptive statistics (means, standard deviations, & percentages) and inferential statistics (t-test & the Analysis of variance) were used for data analysis. The findings indicate that the SML module resulted in significant learning gains better perception of the environment and provided appropriate opportunities for student participation and interaction. The study concluded that the SML module was helpful in enhancing the teaching and learning of mathematics. The module was found to facilitate in making the subject more understandable to students and hence improved student performance in the subject.

### **Introduction**

The general performance in mathematics among secondary school students in Kenya has been poor for many years (KNEC 2000a; 2000b). This means that Kenya may not achieve her goal of industrialisation by the year 2020, for which mathematical knowledge is necessary. Studies conducted on students' performance in mathematics reveal that the language of mathematics is one of the major factors responsible for the poor performance in the subject (Eshiwani 1983). No specific and precise language of instruction has been developed to facilitate students' understanding of mathematical concepts and skills. It is not clear what language would be appropriate for mathematics instruction in secondary schools. However,

it was important to begin somewhere in an attempt to come up with such a language.

Since the topic Statistics is applicable in many fields of study and also in everyday life, and uses a lot of mathematical language, it provided a starting point for the study. A Socialised Mathematical Language (SML) module to enhance students understanding of mathematical concepts and skills in statistics and perception of their learning environment; was thus developed and tried out.

The purpose of the study was to investigate the effect of the integrated mathematical language module (developed during the study), herein referred to as the Socialised Mathematical Language (SML) module for teaching and learning statistics on students' understanding of concepts. The effect of SML on students' perception of their learning environment was also determined.

## **Methodology**

The study involved 166 Form Two students selected randomly from four district schools in Bungoma district during 2002. The selected students were drawn as a single stream randomly drawn from each of the four selected schools. The district has 25 provincial, 93 district and seven private schools. The accessible population was 2,400 students. The district was selected because students' performance in mathematics has been poor (District Education Office Bungoma, 2001). Available statistics showed a performance index of 2.580, 3.125, 3.025, 3.485 and 3.640 for 1996, 1997, 1998, and 2000 KCSE examination respectively. Although these figures indicated an improving trend, they represented less than a third of the maximum aggregate score of twelve points.

The study focused on public secondary schools in the district category. This is because there are more district secondary schools as compared to provincial and private schools, thus assuring availability of respondents for the study. Besides, students admitted into these schools have almost the same qualification based on their Kenya Certificate of primary Education (KCPE) examination performance. This would provide a basis for generalisation of the results. Form two students were chosen because the topic 'statistics' chosen for study is taught at this level (KIE 1992). 'Statistics' was selected because students' performance in the topic is relatively poor in KCSE examinations and consequently, the topic is rated among the most difficult ones in mathematics (Kamau 2000; KNEC 2000b). In addition, 'statistics' has a lot of mathematics symbols, and terminology of which students seem to hold an inadequate understanding.

## Research Design

Quasi-experimental design adapted from the Solomon Four-Group Experimental design was employed for this study. This design is considered appropriate for quasi-experimental studies because it provides the most effective and efficient tools available for determining cause and effect relationship (Ary *et al.*, 1972; Borg 1987; Koul 1992; Ogunniyi 1992). Besides, the design provides adequate control of other variables that may contaminate the validity of the study. The design involves a random assignment of intact classes of subjects to four groups with two groups being experimental and the other two as controls. Table 1 illustrates this study design.

**Table I: Solomon Four-group experimental Design**

Group	Pre-test	Treatment	Post-test
E1	01	X	02
E2		X	03
C1	04		05
C2			06

**Source:** Ary *et al.*, (1972) p.247

As shown in Table 1, four groups of subjects: the experimental Group One (E1), the Experimental Group Two (E2), the control group one (C1) and the control group two (C2) were used. Groups E1 and E2 formed the experimental group while C1 and C2 were the control groups. Groups E1 and C1 received a pre-test( 01 & 04) to ascertain whether or not the groups under study had comparable characteristics while E1 and E2 got treatment (X) that was an exposure to the SML module.

All groups in this study received a post-test that facilitated comparisons between the groups. However, to avoid interaction of subjects from different groups, one class from a school constituted one group of subjects, hence the requirement of four schools for the study. There was random assignment of selected classes to both groups because schools chosen for the study did not allow intact classes to be split.

## The Design of the SML Module

The development of the SML module for this study took four weeks. The module was developed for teaching and learning the topic statistics in mathematics. The content of the module was based on the KIE approved syllabus, the teachers guide and students' textbooks. The main concern of the SML was to simplify the language used in presenting the concepts and skills in statistics in three areas namely data collection and organisation, measures of central tendency and data representation. These content areas were presented in twelve lessons (two double



lessons of 80 minutes each and eight singles of 40 minutes each) and taught to form two students for over a period of two weeks. The language used in this module integrated the ordinary English language and the mathematical language in the context of teaching and learning the topic statistics in mathematics.

### **Instruments**

In the study, four instruments were used to collect data. These were the students' questionnaire, teachers' questionnaire, an observation schedule and achievement test. The students' questionnaire referred to as the Student Perception Questionnaire (SPQ) was a five-point Likert-type tool consisting of 20 structured items, which solicited views of students about their learning environment during statistics lessons. The teachers' questionnaire referred to as the Teacher Evaluation Questionnaire (TEQ) was a five-point Likert-type instrument consisting of 25 items that solicited teachers' views, feelings and opinions about the SML module.

The observation schedule namely:- the Mathematics Classroom Observation Schedule (MACOS) guided classroom observations during statistics lessons. It contained six items on teacher-related activities and eight items on student-related activities. The Mathematics Achievement Test (MAT) had a total of 25 items testing skills in data collection, data organisation, measures of central tendency, and data representation.

### **Data Analysis**

The study generated both qualitative and quantitative data that was analysed both descriptively and inferentially. Raw data were summarised in form of tables showing means, standard deviations and percentages. A one-way Analysis of Variance (ANOVA) was used to ascertain statistical significance. In order to establish exactly where the mean differences lay and the direction of the difference, an independent samples t-test was performed.

This was further confirmed by the Turkey's Honest Significant Difference test. These tests were chosen because they provide simple and accurate results. All tests of significance were conducted at  $\alpha=0.05$  level. In addition, brief presentations in tabular form and narrations of the qualitative data collected were done to test hypothesis four. Also, the analysis of the teachers' evaluation of the SML module was analysed qualitatively.

### **Background**

Despite its importance in the school curriculum and everyday life, mathematics is a subject that seems to be little understood by many secondary school students in Kenya. This can be inferred from the poor performance levels as depicted by the

Kenya Certificate of Secondary Examination (KCSE) results (KNEC 2000c) shown in Table 2.

**Table 2: Summary of KCSE Performance from 1996 to 1999 by %**

Near	Piper	Mean score	Standard deviation
1996	1	17.43	17.09
	2	19.09	16.59
	Overall	36.24	32.99
1997	1	17.44	16.69
	2	15.50	15.49
	Overall	32.62	31.59
1998	1	19.59	18.23
	2	15.64	15.25
	Overall	35.04	32.71
1999	1	13.46	13.85
	1	11.46	11.76
	Overall	24.45	24.94

Source: KNEC (2000b; 2000c) reports

The mean scores indicate that on the overall the students scored an average of about 35 marks while the standard deviations figures show that on the overall the students varied by 32 marks above and/or below the mean scores during the years indicated. This implies that the candidates who sat for the examination during these years had mastered less than 35% of the prescribed syllabus (KNEC 2000c). Further scrutiny of the results by KNEC shows that the most poorly performed topics in mathematics were algebra, 3-dimensional geometry and statistics (KNEC 2000b; 2000c).

An analysis of the KCSE examination question papers indicates that questions on statistics as compared to other topics keep recurring year after year yet no remarkable improvement has been realised in terms of student performance. Since Statistics is essential in many sectors, it is important that students are encouraged to excel in it.

Many of the serious problems faced by secondary schools with regard to instruction in mathematics today may not be attributed to deficiencies in the curriculum, teaching or assessment. This is in agreement with scholars who have expressed the view that learning difficulties in mathematics spring from language considerations rather than inherent conceptual difficulties of the subject (Bunyi 1994; Eshiwani 1983; 1984; Gihua 2002). This provides evidence to suggest that there is a language problem in mathematics and students have problems in understanding and inter-relating the symbols and the special language structure used in mathematics. Although 'statistics' owes much from the theory of probability, the topic on probability is among the better-performed topics. Indeed, statistics has a lot of symbols and notations for which students may have inadequate understanding.

Githua (2002) concurs in arguing that the specialised language in mathematics tests and examinations is one factor that could contribute to poor performance. The KNEC report (2000b) has advised teachers to break down the complex language contained in mathematical concepts to a language that students can comprehend. It argues that one of the principle problems of language in mathematics is that meanings to be conveyed are often complex. The reason being, English words take different meanings when used in different contexts.

Further, teachers have difficulty in communicating mathematical ideas or even simple instructions to students because they have difficulty in comprehending the mathematical language. Consequently, in order for the teacher to communicate with the learner well, a good command of language is very important. Students' perception of mathematics and the environment in which it is learnt might be negatively affected by the teacher's approach in presenting the subject matter. In addition, Githua (2002) argues that the sentence structure, length and unfamiliar symbols and terminologies make mathematics textbooks difficult to read and comprehend. Thus, the foregoing discussion suggests that there is an inadequate understanding of both the English language and the mathematical language as used in mathematics instruction

### **Language of Instruction**

Research by Keraro, Okere and Mondoh (2004) shows that language interferes with science learning, especially when English is used as a medium of instruction to second language users. Thijs and Van den Berg (1995) and, Ramorogo and Kiboss (1997) have argued that cases where English has been used in teaching science, teachers and learners need to have a good command of the English language for meaningful learning to take place.

This is in agreement with Tobin (1995) who says that learners with limited proficiency in the use of English often face enormous challenges of making sense of instruction while at the same time building an understanding of science. He further alludes that science is a form of discourse that incorporates a language characterised by concepts and facts, ways of providing knowledge claims and ways of communicating what is known among participants in a community. This suggests that ordinary English may not be the best medium for science instruction. This is because English words take different meanings when used in different contexts.

Arguably, learners' meaning of some words is different from that of scientists. In some cases, pupil's meanings are narrower and confined to meanings often used in their everyday language. Elsewhere, studies show that any language could be used for instruction. Rutherford and Nkopodi (1990) reported that the use of English enhanced the recognition of science concepts. Conversely, Rolnick (1990) reported that the use of mother tongue (Siswati) rather than English facilitated the learning and expression of science concepts among Swazi students. In Kenya,

studies (Bunyi 1994) reveal that the use of Mother Tongue for teaching **and** learning mathematics has a positive effect on enhancing students' acquisition of concepts and performance.

However, based on the school language policy in Kenya; that language **of** instruction is language of catchment area at lower primary renders such findings inapplicable at the secondary school level. Indeed, learners tend to construct their knowledge by observing others and co-participation in a community (Roth, 1995). Given the multilingual and multicultural classrooms currently characterising most schools in Kenya, language is a formidable constraint if learners who **do not** understand the English language are expected to construct and participate in **the** classroom mathematics activities. Perhaps a socialized mathematical language could enhance student understanding of mathematics in Kenya.

### **Language of Mathematics**

Mathematical language appears to pose a problem to students and teachers in **the** process of teaching and learning. The vocabulary of mathematics includes **words** and symbols that have multiple meanings. Consequently, pupils often fail to interpret these words and symbols as teachers intend them. Therefore understanding of mathematical words in prose seems to be a major **problem**. Lawing (1983) however asserts that, in order to translate a sentence into **a** mathematics problem, one needs to know what the words in the sentences **mean**. He argues that most problems are not difficult to solve when written in mathematical terms but the difficulty arises when the problem is stated in prose.

Copeland (1984) claims that whatever you say to mathematicians, they translate it into their own language and forthwith it becomes something different. He argues that the transfer of what has been learnt in one problem situation to another is important and necessary in understanding mathematics because such cognitive structures as seriation, conservation, commutativity and transitivity are basic parts of many mathematics problems.

This means that words are probably not a shortcut to understanding because **when a** student comes across word problems in textbooks and examinations, which **test** application and generalisation, the stimulus is not readily apparent. Hence **finding** the appropriate response of the problem becomes difficult to some students **while** others, who have developed some working procedures and processes on their **own**, tackle them with success.

## Results, Discussions and Conclusions

### Results

#### *The Effect of the SML Module on Students' Achievement*

The main objective of the Mathematics Achievement Test (MAT) was to ascertain whether or not there was a significant difference between the students' understanding as measured by their knowledge and skill performance. Section A was concerned with assessing students' knowledge in statistics. The hypothesis tested was whether the SML module had significant effect on students' achievement in statistics. The results obtained are summarised in Table 3.

**Table 3: Comparison of the mean pre-test and post test scores and standard Deviations obtained by student on section A of the MAT**

Scale	Overall		Group		
Pre-Test	38.71	38.93a	-	38.49a	-
SD	8.99	9.45	-	8.53	-
POST-TEST	71.73	77.80b	77.10b	65.30c	66.70c
SD	11.35	10.84	11.32	11.40	11.84
MEAN GAIN	33.02	38.87	-	26.81	-

a, b, c denotes similar mean scores

Table 3 shows that the post-test mean scores for groups E1 and E2 and that of C1 and C2 respectively, are quite similar. On overall, the groups mean gain on student's achievement in knowledge of statistical concepts was 33.54. However, the mean gains for group E1 (38.87) was significantly higher (by 12.06) than that of group C1 (26.81). This suggests that the experimental group gained more than the control group. In order to determine whether the difference in mean scores was significant, a one way ANOVA was performed. Table 4 summarises the results of the ANOVA.

**Table 4: Results of One-ANOVA of the post-test scores of the groups on section A of the MAT**

Source	D.F	SS	MS	E-ratio	P-Value
Between Groups	3	623.88	207.96	7.46*	<b>0.00</b>
Within Groups		153	4265.16	27.88	
<b>Total</b>			<b>156</b>	<b>4889.04</b>	

\* Denotes significant mean difference at  $P < 0.05$  (F tabulated 3.153=2.67; F computed=7.46)

The results in Table 4 reveal that the differences in the post-test scores in section A of the MAT are statistically significant for the experimental and control groups. However this analysis does not show the direction of the difference. In order to determine where the mean score difference lie and the direction of the difference, a

post hoc multiple comparison test for an independent sample t-test was performed and the results obtained are reported in Table 5.

**Table 5: Results of Independent Sample t-Test of Post-Test Mean Scores Obtained By the Groups**

Groups	DF	t-Value	2-Tail	C-Value
E1. vs E2	69	0.12	0.27	1.99
E1. vs. C1	72	2.74*	0.86	1.99
E1. vs ,C2	85	3.54*	0.01	1.99
C1. vs. C2	83	0.45	0.66	1.99
C1. vs. E2	67	2.32*	0.00	1.99
C1. vs. C2	82	3.93*	0.26-	1.99

\* Denotes significant at  $p < 0.05$

The t-test analysis reported in Table 5 reveals that the mean scores obtained by the students within the treatment groups (E1 & E2) and control groups (C1 & C2) respectively were not statistically different. However, there were significant differences between the mean scores of the experimental groups and control groups such that the mean scores obtained by the treatment groups were significantly higher than those in the control groups.

A comparison of the post-test mean scores yielded t-values of  $t(1,73)=2.74$ ,  $t(1,86)=3.54$ ,  $t(1,68)=2.32$  and  $t(1,83)=3.93$  at  $P < 0.05$ . A farther analysis of the difference using Turkey's - Honest significant Difference (THSD) test also revealed the following trend:  $E1+E2 > C1=C2$ , thus suggesting that the students who were exposed to the SML Module out-performed those who were not exposed to it in section A of the MAT.

Considering the results presented in Tables 3,4 and 5, it was found that the post-test mean scores obtained by students in Groups E1(77.80) and E2(77.10) were not significantly different at  $P=0.05$ . Also the mean scores of groups C1 (65.30) and C2(66.70) are not different. However, the mean scores obtained by the students in groups E1 and C1, E1 and C2, E2 and C1 and, E2 and C2 are significantly different at  $p < 0.05$ . In addition, the t-values confirm that the difference between the means obtained by students in the treatment groups and those in the control groups in section A of the MAT is statistically significant. In view of these findings the null hypothesis suggesting that the SML module has significant effect on student's achievement in statistics is rejected.

### **The Effect of the SML Module on Students' Skill Performance**

Section B of the MAT was developed to ascertain whether or not there was a significant difference between the students' skill performance before and after the commencement of the topic statistics between the students exposed to the SML module and those not exposed. This was meant to test the hypothesis that the SML module has no significant effect on students' Skill performance in statistics. The

results on students' skill performance are reported in Tables 6, 7 & 8. The interpretations are made below each table.

**Table 6: Comparison of the Means & Std. Dev. of Pre-test and Post-test Scores obtained by students on Section B of the MAT**

Scale		Overall			Group	
		E1	E2	C1	C1	C1
PRE-TEST	21.80	22.38a		21.27*		
S.D.	2.78	2.77		2.45		
POST-TEST	73.48	78.65b	77.28	69.22*	68.75*	
S.D	6.15	3.95	3.25	4.32	4.17	
MEAN GAIN	51.62	56.27		48.00		

\* abc denotes similar mean scores

Results in Table 6 show that the pre-test mean scores obtained by the students' in group E1(22.38) and C1(21.27) were similar before teaching the mathematics topic on statistics. After the exposure to the topic, the students in the experimental group scored a higher mean score E1 (78.65) than those in groups C1 (69.22) and C2 (68.75). Similarly, Group E2 scored a higher mean score (77.28) than those in groups C1 and C2. The mean gain of statistical skills for group E1 (56.27) and for the whole group (51.75) were both higher than that of group C1 (48.00).

This suggests that there were differences in the mean scores obtained between the experimental groups (E1 &E2) and control groups (C1& C2); implying that the skill performance of the students in the SMI. treatment groups was better than those in the control groups. In order to establish whether the differences were significant, a one-way ANOVA was done. The result as summarised in Table 7.

**Table 7: Results of ANOVA of the Post-Test Scores of students on Skill performance**

Source	DF	SS	MS	F-value	P-value
Between Groups	3	1065.36	355.12	9.11*	0.05
Within groups	153	5966.07	38.99		
<b>Total</b>	<b>156</b>	<b>7031.43</b>			

Means significant at  $p < 0.05$

From the results in Table 7, the F-value ( $F_{3, 153} = 9.11$ ,  $p < 0.05$ ) indicates that the mean scores of the groups were significantly different. However, this analysis does not show the direction of the difference. In order to determine the direction of the difference, the independent samples t-test was performed and results obtained are reported in Table 8.

**Table 8: Independent Sample T-Test of Post - Test Mean Scores on Students' Skill Performance**

G groups	DF	t-VALUE	2-TAIL SIG	C-VALUE
E1 vs E2	69	0.33	0.75	1.99
E1 vs C1	72	3.58*	0.86	1.99
E1 vs C2	85	3.06*	0.96	1.99
C1 vs C1	83	0.12	0.15	1.99
C1 vs E2	67	3.54*	0.77	1.99
E1 vs C2	82	3.80*	0.67	1.99

\* Significant at  $p > 0.05$

Table 8 reveals that the mean scores obtained by the students in the experimental groups were significantly different from and higher than those in the control groups. A comparison of the post-test t-values of  $t(1, 72) = 3.58$ ,  $t(1, 85) = 3.06$ ,  $t(1, 67) = 3.54$  and  $t(1, 82) = 3.80$  at  $p < 0.05$  level were obtained. A further analysis of the difference using THSD test also confirmed the trend  $E1 = E2 > C1 = C2$  at 0.05 level. This implies that the students who were exposed to the SML module performed better in section B of the MAT than those not exposed.

From the results presented in Table 6, 7 and 8 it suffices to say that the post-test mean scores of the experimental groups ( $E1 = 78.65$  &  $E2 = 77.28$ ) are not statistically different at  $p = 0.05$ . Also the mean scores of the control groups ( $C1 = 69.22$  &  $C2 = 68.75$ ) are not statistically different at the same level. However, there is a statistically significant difference between the experimental groups and the control groups at  $p = 0.05$  level, where the former scored significantly higher values than the latter. In addition, the t-values confirm that the difference between the mean scores obtained by the students in experimental and control groups on skill performance statistically significant at 0.05 level. In view of the foregoing presentation and interpretation of the results on skill performance, the null hypothesis indicating that the SML module has no significant effect on students' skill performance in statistics is rejected.

### **The Effect of SML Module on Students' Perception of Their Mathematics Learning Environment**

The aim of the Students' Perception Questionnaire (SPQ) was to ascertain whether or not there was a significant difference between the mathematics learning environment before and after the topic "statistics" between the students exposed to the SML module and those not exposed. The null hypothesis tested was that the SML module has no significant affect on students' perception of their learning environment. Table 9 shows the mean scores on students' perception as measured by the SPQ.



**Table 9: Comparison of Mean Scores & Std. Dev. of Students' Perception as Measured the SPQ**

Scale	Overall	Groups			
		E1	E2	C1	C2
PRETEST	56.56	56.78a	—	55.94a	—
SD	9.61	8.74	—	10.48	—
POST-TEST	74.18	78.49b	76.41b	70.31b	71.52c
SD	8.43	8.09	8.12	8.38	9.13
MEAN GAIN	17.82	21.71	—	14.37	—

a,b,c, denotes similar mean scores.

An analysis of the results in Table 9 reveals that the pretest mean scores of E1 and C1 and the post-test mean scores of group E1 and E2 and, C1 and C2 respectively are quite similar. However, the mean gain for group E1 (21.71) was higher by 7.34 points than that of group C1 (14.37). Overall, the mean gain on the SPQ was 17.82. Hence, the former group is closer to the overall mean gain for the whole group than the later. The results suggest that the perception of the students in the treatment groups on SPQ was different from those in the control groups (E1=E2>C1=C2). A further analysis of the post-test mean scores using the ANOVA gave the following results.

**Table 10: Results of ANOVA of the Post-test Scores on the SPQ**

SOURCE	DG	SS	MS	F-RATIO	P-VALUE
BETWEEN GROUPS	3	1806.11	602.04	5.90*	0.001
WITHIN GROUPS	153	15503.50	102.10		
TOTAL	156	17309.61			

\*Means significant at p<0.05

The result in Table 10 confirms that the mean scores between the groups on the SPQ differ significantly at p<0.05 level. However, the results do not show the direction of the difference. In order to determine the direction of the difference, an independent samples t-test was performed. Table 11 suggests the possible difference and direction of the difference.

**Table 11: Results of the Independent Samples t-test**

Group	DF	t-value	2 TAIL SIG
E1 vs E2	69	0.32	0.42
E1 vs C2	72	4.38*	0.00
E2 vs C2	85	4.77*	0.00
C1 vs C2	83	0.56	0.12
C1 vs E2	67	2.47*	0.75
E2 vs C2	83	2.48*	0.45

\* Means significant at p<0.05.

An examination of the results in Table 11 reveals that the t-values of E1 and E2 (t=0.32) and that of C1 and C2 (t=4.77), C1 and E2 (t=2.47) and E2 and C2

( $t=4.38$ ) indicate statistically significant difference in the post test mean scores on SPQ in favour of the treatment groups. A further analysis of the difference using the THSD test also confirmed that  $E1=E2 > C1 = C2$  at 0.05 level.

From the foregoing presentation, it can be noted that although E1 and C1 groups were pre-tested, their post-test mean scores are not significantly different from those of E2 and C2 respectively. This means that the pre-test did not exert any impact on the post-test mean scores of the SPQ. Therefore, the significantly higher mean scores obtained by the treatment groups compared to the control groups were due to the SML module rather than chance. Therefore, the null hypothesis indicating that the SML module had no significant effect on the students' perception of their learning environment is rejected.

### **The Effect of the SML Module on Classroom Interaction during Mathematics Lessons**

The purpose of the mathematics classroom observation schedule (MACOS) was to assess lessons of the experimental and control groups during class instruction on the topic statistics. Data on student - teacher student and material interaction were collected from at least three lessons taken from each of the SML and regular classroom respectively. The hypothesis tested was that the SML module has no significant effect on classroom interaction during mathematics lessons. The frequency of the classroom activities observed in this study was calculated as a percentage and the results are reported in Table 12.

**Table 12: Comparison of Teachers' and Students Activities during Mathematics Lessons in Statistics by Percentage**

Category	Groups			
	E1	E2	C1	C2
Teacher activity	9.9	10.8	5.8	5.4
Reinforcing behaviour	6.3	6.2	11.3	10.2
Giving directions	9.6	9.4	6.9	5.8
Supervises activities	6.6	6.6	6.8	6.9
Asks questions	4.8	4.2	9.9	8.4
Guides/demonstrates skill	3.1	3.6	10.8	9.2
Explains concepts and skills	40.1	40.8	45.5	44.9
Total				
Student Activity				
Responds to questions	9.5	9.2	7.6	6.9
Follow instruction	8.4	8.7	11.8	10.9
Initiates classroom talk	7.2	8.4	4.7	4.6
Asks questions	12.7	10.6	3.2	3.4
Writes or copies notes	7.1	7.4	1.2	7.7
Expresses agreement	9.1	8.8	12.4	11.8
Periods of silence inactivity	1.6	1.3	5.8	5.9
Consults other students	4.2	4.8	1.8	2.9
Total	59.9	59.2	54.5	56.9

Table 12 shows the classroom activities observed during the class instructions. The table suggests possible similarities and differences between the teachers' and students activities in the experimental and control groups. It indicates that on overall, the teacher in groups E1 and E2 did less of the class activity as compared to groups C1 and C2. On the other hand, the students in E1 and E2 as compared to C1 and C2 dominated the classroom activities.

However, in order to ascertain whether there were differences in interaction patterns during the mathematics activities observed in the lessons, the frequencies obtained were transcribed into a score. The scores for each classroom lesson observed in each group were then used to determine whether the SML augmented classes differed from the regular classes in the way teachers and students interacted in a normal classroom setting. Table 13 shows the respective means and Standard deviations for the groups.

**Table 13: Means and Standard Deviation Obtained By Groups on MACOS**

SCALE	E1	E2	C1	C2
MEAN	76.75a	75.04a	61.88b	61.38b
SD	11.07	10.78	9.30	8.28

a and b denote similar mean scores

Table 13 compares the mean scores obtained by the groups on MACOS. A close examination of these results indicates higher mean scores for treatment groups than for control groups. Also, the mean scores between the treatment groups (E1 =76.75

& E2 = 75.04) and the control groups (C1 =61.88 & C2 = 61.38) are not similar unlike within the groups. The treatment groups have similar results due to the same SML treatment to which they were exposed. In order to ascertain the significance of the difference between the groups, a one-way ANOVA test yielded the results summarised in Table 14.

**Table 14: Results of ANOVA of the MACOS Mean scores**

SOURCE	DG	SS	MS	F-RATIO	P-VALUE
BETWEEN GROUPS	3	63.15	21.05	5.95*	0.00
WITHIN GROUPS	14	49.59	3.54		
TOTAL		17	112.74		

\* Significant at 0.05 level

Result of the ANOVA indicate the F-value to be significant at  $p < 0.05$ . This means that the mean scores obtained by the SML treatment and Control groups were statistically different. However, the ANOVA test does not show the direction of the difference. As such, an independent samples t-test was performed and the results reported in Table 15.

**Table 15: Results of Independent Samples t-test of Post-test Mean scores obtained on MACOS**

Group	DF	t-value	SIG
E1 vs E2	69	0.34	0.50
E1 vs C2	72	7.43*	0.00
E2 vs C2	85	8.62*	0.03
C1 vs C2	83	0.51	0.76
C1 vs E2	67	6.54	0.00

\* Denote Significant at  $p < 0.05$

Table 15 confirms where possible differences and the direction of the differences are. It shows that there are differences between the experimental and control groups which are significant. There are however no significant differences within the experimental and control groups. Similar results were obtained using the Turkey Honest Significant Difference (THSD) test revealed the following trend:  $C1 = C2 < E1 = E2$  at 0.05 levels. This suggests that the SML programme had similar effects on both experimental groups.

From the foregoing presentation and interpretation, the significantly higher mean scores obtained by the treatment groups as compared to the control groups was due to the SML treatment. Therefore, the null hypothesis indicating the SML module has no significant effect on classroom interaction during the mathematics lessons is rejected.

## **Discussion**

There were four hypotheses set for this study. For all the hypotheses, the findings of this study are in the affirmative of a significant effect of the SML module. The findings are in favour of the students exposed to the SML module. The inferential statistics have revealed that there were differences between the mean scores obtained by the students in the SML treatment groups (E1 & E2) and those of the control groups (C1&C2) that were statistically significant. Therefore the results show the effect of the SML in engendering cognitive, affective and psychomotor gains.

The SML module developed for teaching and learning the topic 'statistics' in mathematics was found to be readable, understandable, clear and simple in presenting statistical concepts and skills on the part of students. Teachers on the other hand found the module to have clear and elaborate lesson notes that were simplified for students understanding even on their own. This implies that the module succeeded in simplifying the language used in presenting mathematical concepts and skills in the topic 'statistics'.

It was further established that students exposed to this module acquired the needed knowledge, concepts and skills. This can be inferred from the higher mean gains obtained on all the dependent measures by students exposed to it as compared to those not so exposed. On achievement, the results show a positive influence on students' knowledge and skill performance in favour of the module. This is an indication that SML module had an effect on students' understanding of the topic "statistics".

Nonetheless, the results indicates that the SML learning environment was conducive for meaningful learning. The students' perceptions show a significant difference between the SML and regular learning environments. This is the reason why students in the treatment groups had significant learning gains unlike those in the control groups. The higher mean scores in the students perception scores in favour of the treatment groups confirm that the SML module had an effect on students' perception of their learning environment.

The learning environment provided in the 'SML' classrooms facilitated mutual interactions during the lessons in the topic statistics. This follows from the tabulated results and narrations reported earlier. Specifically, the SML module provided appropriate opportunities for interpersonal communication and relationship. Both the quantitative and qualitative results ascribe the effect of the SML module on classroom interactions during mathematics instruction.

From the teachers' evaluation of the module, there is no gender bias in treatment groups. Both boys and girls had equal opportunities to participate in the lesson activities. On the whole, the foregoing suggests an effect of the SML module on

students, understanding of mathematics and perception of their learning environment.

The teacher's role in the lesson is a major determining factor of the classroom environment. According to Ramorogo and Kiboss (1997), meaningful learning often develops best in classroom environments that give students more opportunities for more participatory interaction. Perhaps, this is the reason why the teacher in the SML treatment groups provided more student participation opportunities as seen in table 16 and the subsequent narration in the excerpts. This is in agreement with Kiboss (1997; 2000) who found a strong relationship between the nature of the conducive classroom environment and the acquisition of the necessary knowledge and skills.

This study has shown the interactiveness of the lesson components. Contrary to earlier studies in Kenya which indicate that some students have greater interaction with their teachers than do others (Sanga 1982), the findings of this study have placed all the students on the same level i.e. all the students in the classroom (irrespective of their gender) have equal opportunities to interact and participate fully in the lesson(s). In addition, the results have shown that teachers have to explain terminologies and phrases used in the subject.

The KNEC reports (2000b; 2000c) have made similar views whereby they advise teachers to break down the complex language contained in mathematical concepts to simple language that students can comprehend easily. Indeed, studies have shown that collaborative socialization during the teaching and learning process is critically important in students, performance (Johnson & Johnson 1991; Kiboss 1997; 2000; Kirembu 1991).

## **Conclusions and Recommendations**

### **Conclusions**

The following conclusions have been reached from the analysis of the data presented in the previous chapter. First and foremost, the pre-test mean scores of E1 and C1 were identical while their post-test mean scores with respect to MAT, SPQ and MACOS were statistically different. However the post-test scores within the experimental groups (E1 & E2) and control groups (C1 & C2) respectively regarding the same variable were quite similar. Although E1 and C1 had an increase in the post-test mean scores, there were higher increase realized in E1 that were similar to E2 denied the pre-test. The increase in the mean score of the C1 that was similar to C2 was as a result of exposure to the content. Therefore, the pre-test did not have any effect on the post-test. Hence, the difference in the posttest mean scores of the treatment and control groups is attributed to the SMI. treatment.

Secondly, there were significant learning gains obtained by the students exposed to the SML module on both sections of the MAT instrument as compared to the low learning gains obtained by those students not exposed to the SML treatment. Unlike the mean scores of the two treatment groups E1 and E2, the mean scores of the control groups C1 and C2 were similar and significantly different from those of the former with respect to MAT, SPQ and MACOS measures.

In contrast to the subjects in control groups (C1 & C2), the students' perception of their learning environment as measured by SPQ in the treatment groups (E1 & E2) was quite encouraging. Similar conclusions are reached regarding the Students' participation as observed during the lessons. It has been concluded that the teacher in the regular classroom tends to dominate the classroom activities and talks whereas in the SML augmented classes, the students tend to dominate both the classroom activities and talks. In addition, the SML module affected the students' understanding of mathematics and their perception of the learning environment by engaging them in interactive Endeavour's that resulted in their self-actualisation and subsequent ownership of the lessons. Indeed both quantitative and qualitative data have shown that the SML enhanced the students' interpersonal communication and interaction.

Furthermore, the effect of gender and age did not seem to exert any significant influence on the students' knowledge, perception and interaction in the topic statistics. An analysis of the TEQ suggests that the SML provided equal opportunities for both boys and girls to collaborate, support and interact together. The teachers' role was shifted from the role of transmitter of knowledge to that of a facilitator in the teaching-learning process.

## **Recommendations**

Based on the findings and conclusions, the study recommended that the SML approach be adopted for mathematics instruction in Kenyan secondary schools. This follows from the significant learning gains obtained by students exposed to the SML module. Teachers should explain the terminology and symbols in mathematics, as opposed to their usual meaning in English. Although the MoE and KNEC has formally recognised that there is a language problem in Mathematics Education, there is need to familiarise teachers, students, authors and publishers on the usefulness of popularising the use of SML as a teaching and learning strategy.

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## **EFFECT OF STREAMING BY GENDER ON STUDENTS' PERFORMANCE IN SECONDARY SCHOOL MATHEMATICS IN NAKURU DISTRICT**

*Anne C. Barmao and Helen O. Mondoh*

### **Abstract**

There is evidence that boys tend to score higher than girls in mathematics, particularly in mixed-sex schools. On the basis of such evidence and other non-academic reasons, some co-educational schools in Kenya have in recent years separated boys from girls in class with the hope that the performance of girls in mathematics might improve. The results of this venture have not been documented. This study was designed to determine the effect of streaming by gender on secondary school students' performance in mathematics. An ex-post facto research design was adopted to collect the required data on students' performance in secondary school mathematics in Nakuru District. Data was collected through a documentary search of the Kenya Certificate of Secondary Education (K.C.S.E) mathematics examinations results of 1489 students for the years 1999, 2000 and 2001 in selected secondary schools in Nakuru District. In addition, 22 mathematics teachers were interviewed. Both qualitative and quantitative data were generated hence descriptive (means, standard deviations and percentages) and inferential (t-test and the one-way Analysis of variance at  $\alpha = 0.05$ ) statistics were used for data analysis and hypothesis testing respectively. The results of the study indicated that streaming by gender in the mixed-sex segregated school improved the performance of both boys and girls in mathematics. However, the study recommended that policy recommendations on streaming by gender be made with caution.

### **Introduction**

Performance in mathematics among secondary school students in Kenya has plummeted for many years (KNEC, 2000a; 2000b). Girls in particular continue to perform poorly compared to boys. This means that more girls will be disadvantaged in taking university courses and in career areas where a good grade in mathematics is required. Many studies have been conducted on girl's Performance in the subject and various factors have been identified as responsible for their dismal performance. In particular mixed sex schools where both boys and girls sit together have been criticised for inhibiting the performance of girls in Mathematics (Costello 1991; Githua 2002; Pamela 2000; Spender 1980).

The main argument is that such classroom instructional arrangements favour boys at the expense of girls. As a result, some co-educational schools have separated or streamed classes on the basis of gender with the hope that performance of girls in mathematics may improve. However, there are no documented studies that have been carried out especially in Kenya to ascertain the extent to which this measure has generated any positive results.

The lack of this information limits provincial Directors of Education and Mathematics Quality Assurance Officers in advising administrators of co-educational schools on effects of streaming on students' performance in mathematics in Kenya's secondary schools. The study sought to find out the effect of streaming by gender on students' performance in mathematics, and particularly, the extent to which this measure improves the performance of girls in the subject.

## **Methodology**

The study adopted an *ex-post facto* research by using the causal-comparative design. Four types of schools were used in this study for comparison purposes. These were; mixed-sex segregated schools (Boys and girls in a mixed school are taught in separate streams); normal mixed sex schools (Boys and girls in a mixed school are taught in the same stream), girls' only schools and boys' only schools. Further, the study examined students' performance in mathematics in mixed-sex segregated secondary schools and then related it to streaming by gender in mathematics classes.

The study was carried out in Nakuru district. The district was purposively selected for two reasons.

- (i) It has good catchments of co-educational secondary schools, which have streamed classes on the basis of gender (a phenomenon that the study investigated).
- (ii) Schools within Nakuru district are accessible by basic common means of transport. It was therefore possible to trace respondents and collect the required data within the acceptable time with minimum delay and cost.

Purposive sampling technique was used to select all the four national secondary schools in Nakuru district and the cohorts that formed the study population. This technique involves picking cases that are typical of the population being studied (Kathuri & Pals, 1993). Secondary schools in the national category were selected since it is the only category that had all the four types of schools. It was also the only category of schools that ensured homogeneity, hence enabling the **researcher** to make comparisons in performance in mathematics based on streaming by gender.

The target population consisted of form four students who sat for the KCSE examination in the years 1999, 2000 and, 2001 at the selected schools. The

students in the 1999 cohort were from the mixed segregated school only. There were 1231 students in the four schools for the years 2000 and 2001. In 1999, there were 258 students in the mixed-sex segregated school hence an accessible population of 1489 students. These groups of students were selected because around this period (2000 and 2001), students in the mixed sex segregated school sat their KCSE examinations after having been taught in single-sex classes.

In addition, students in the mixed-sex segregated school sat their K.C.S.E examinations in 1999 after having been taught in normal mixed classes. The numbers of students from each category of school were as follows: girls' only (174), boys' only (242), mixed-sex segregated (107 boys and 388 girls) and mixed-sex normal school (78 girls and 242 boys). There were 14 mathematics classes each year in the schools. Table 1 summarises the distribution.

Table 1: Distribution of Form 4 Streams in selected Schools, in Years 1999, 2000 and 2001

School	No. of form Four Streams Per Year.		
	1999	2000	2001
Mixed sex Normal	-	4	4
Mixed sex Segregated	6	6	6
Boys' Only		2	2
Girls' Only		2	2
<b>Total</b>	<b>6</b>	<b>14</b>	<b>14</b>

Therefore, the total number of teachers in the years 1999 (mixed segregated school only), 2000 and 2001 were 34. However, some schools had the same teacher handling a form four class in all the two years or three years in the case of mixed sex segregated school. In addition, during data collection, the researcher discovered that some teachers had been transferred to other schools and a number were not in schools at the time of data collection. Hence the sample for teachers was 22 instead of 34.

Data from teachers was collected through interviews. After the interviews, the KCSE mathematics examination results of students for the years 1999 (in the case of the mixed sex segregated school), 2000 and 2001 in all the schools were documented in a data sheet.

Data obtained from the teachers' interviews were used to supplement the information obtained from the documentary search. The comments were classified according to the categories prompted by a specific question in the interview schedule. The study generated both qualitative and quantitative data that were analysed using both descriptive and inferential statistics. Group comparisons were done using the matrix shown in Table 2.

**Table 2: Data Analysis Matrix**

	B1	G1	B2	G2	B3	G3
B1		B1G1	B1B2	B1G2	B1B3	B1G3
G1			G1B2	G1G2	G1B3	G1G3
B2				B2G2	B2B3	B2G3
G2					G2B3	G2G3
B3						B3G3
G3						

B1 and G1 refer to groups of boys and girls in the mixed-sex normal school, B2 and G2 refer to groups of boys and girls in the mixed-sex segregated school while B3 and G3 refer to groups of boys and girls in boys'-only and girls'-only schools respectively. The mean scores in mathematics for the various groups of boys and girls were used for comparison. In addition, the mean scores of students who did their KCSE mathematics examinations in the years 2000 and 2001 were compared with mean scores of students who did their KCSE mathematics examinations in the year 1999, where boys and girls were taught in the same class in the case of the mixed-sex segregated school. This was for the testing of hypothesis four.

The single t-test and the one-way Analysis of Variance (ANOVA) at  $\alpha = 0.05$  was used to determine statistical significance and group differences respectively. Table 3 gives a summary of data analysis procedures.

**Table 3: Summary of Data Analysis Procedures**

HYPOTHESIS	INDEPENDENT VARIABLES	DEPENDENT VARIABLES	STATISTICAL TEST
Ho1: there is no statistically significant difference in performance in mathematics among students in mixed sex segregated, mixed sex normal and single sex (boys' only and girls' only) schools.	Streaming by gender	Performance in K.C.S.E Mathematics examinations	ANOVA 3 group comparison
Ho3: There is no statistically significant difference in performance in mathematics among girls by school type.	Streaming by gender	Performance in K.C.S.E Mathematics examinations	ANOVA 3 group comparison
Hu4: There is no significant improvement in performance in mathematics when students are segregated who by gender	Streaming by gender	Performance in K.C.S.E Mathematics examinations	Single t-test

## **Background Information**

The rapid spread of co-education has aroused intense interest not only among educators but also the public at large. The subject has been discussed from diverse points of view; moral, economic, and educational among others. There has been a significant divergence of opinion as to the wisdom of co-education particularly in secondary schools. These opinions have usually been based on whether the co-educational environment fosters equal treatment for boys and girls (Pamela, 2000). Performance of students in mathematics in these schools has also been an issue. There have been differences in performance between boys and girls with boys performing well especially in mathematics and sciences and girls excelling particularly in languages (Costello, 1991; Garret, 1987).

In Kenya the scenario is the same. An analysis of the Kenya Certificate of Secondary Education (K.C.S.E) examinations results shows that boys perform better in sciences and mathematics while girls out do boys in arts-based subjects and in languages. For instance, the 1999 K.C.S.E. examination results show that, boys obtained a mean score of 19.96 in mathematics as compared to 12.28 for girls; while in Kiswahili, the mean scores for boys and girls were 80.47 and 82.04 respectively. Table 4 illustrates this difference.

**Table 4: Summary of K.C.S.E Performances of Boys and Girls in Mathematics 1994 - 1998**

YEAR	1998		1997		1996		1995		1994	
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
ENTRY	90541	76012	83878	69229	85146	69873	78313	62190	80649	62466
Number that obtained Grade D+ and above	9672	5022	8383	4164	9338	4702	6576	2987	5871	2500
%	10.68	6.61	10.0	6.01	10.97	6.73	8.4	4.8	7.28	4.0

Source: KNEC (1999) report p. 19

Table 4 shows that the general performance of students in mathematics is poor, with less than **10%** of the students obtaining grade **D+** and above. Girls in particular perform poorly compared to boys. This implies that the proportion of boys who do well in mathematics in KCSE examinations is higher than that of girls. This suggests that less females than males take mathematics-related courses beyond secondary school education. (Abagi, **1992; 1994**; Kyungu, **1998**; Makau, **1994**; Masiga, **1994**). Such a scenario is a source of **worry** in that more women will be closed out of many educational and career opportunities. This will in turn deprive the society of the benefits of women's talent.

In an attempt to improve the performance of girls in mathematics, several studies have been done and recommendations made (Eshiwani 1975; 1984; Githua 2002; Spender 1980). These include teaching these girls through use of the integrated programmed instruction (I.P.D method (Eshiwani 1975; 1984) and gender sensitive instructional methods and learning materials (Kyungu 1998; Masiga 1994); modes of assessment used should not favour boys at the expense of girls; presence of more female mathematics role models in mathematics classrooms and co-operative mode of teaching.

Masiga (1994) advocated for the use of sex-neutral media in the teaching of mathematics in Kenyan secondary schools. There is also some evidence that girls in single-sex schools have advantage in mathematics learning over those in co-educational schools (Garret 1987; Costello 1991; Githua 2002). As a result, they recommend that girls be grouped separately for mathematics teaching and learning since girls may be inhibited in the learning of mathematics by the presence of boys. Consequently, co-educational schools have in the recent years separated boys from girls and both are now being taught in separate classes. However, the implications of this action on student's performance in the subject have not been explored. Further, such separation is likely to lead to declining performance by boys in mathematics (Garret 1987; Lepore and Warren 1997; Spender 1980). They have argued that the presence of girls is necessary in order to promote the positive image of boys. It is against the girls that boys stand out. Given this background, it was important to establish the effect on boys and girls in mathematics when boys and girls are taught in separate classrooms.

## **Theoretical Framework**

This study was guided by two theories on the different ways of socialisation of boys and girls. The theories are; sex role socialisation theory and the school and neighbourhood resources theory. According to the sex role socialisation theory, boys and girls interact at school separately from each other in same sex clusters (Thome 1993). This theory identifies early childhood socialization especially in the home by parents as responsible for differences in educational experience by gender. The different socialisation processes beginning in the family of origin have brought differences in boys and girls in certain areas. These areas include; difference in self-esteem, differences in their opinions about their own abilities, and occupational aspirations.

Baker and Jones (1993) have argued that the different opportunities that boys and girls are afforded in the home shape their experiences in their socialisation processes and in turn shape how they perform at school.

FAWE (1998) and Isaacson (1996) have argued that parents expect high performance in mathematics by boys than girls. In addition, due to the different sex-role identities and socialisation experiences which begin at early stages, girls more than boys tend to be less interested in mathematics. They believe that the subject is a "male" subject and are less confident in their mathematical ability.



hence their poor performance in the subject (Eshiwani 1983; Garret 1983; Spender 1980).

The school and neighbourhood resources theory was developed by Entwisle et al. (1994). They developed this theory in order to explain gender differences in education and particularly in mathematics performance. This theory identifies the school and resources in the neighbourhood as responsible for gender differences in mathematics performance. Studies indicate that young boys are more encouraged, and girls are more discouraged during their exploration of the outside world and neighbourhoods (Bing 1963; Block 1983). Bing (1963) reiterates that the gendered play activities may be associated with boy's superior numerical and spatial ability. Entwisle *et al.*, (1994) further notes that boys' greater freedom and independence in outdoor settings could contribute to their greater cognitive growth in mathematics.

Besides these, the development of the school system as part of a social, structural and political process produces a gender bias in the labour market (Kessler et al. 1985). This bias is evident through the different courses that boys and girls are exposed to, different treatment by teachers and classroom organisation at school (Baker & Jones 1993). The different ways in which these learners are treated in school tends to conform to the societal framework (Kessler, et al; 1985). It could also bring about differences in mathematical performance between boys and girls.

Further, Spender (1980) argues that in co-educational schools, the presence of girls is necessary in order to promote the positive image of boys. It is against the girls that the boys stand out. Eshiwani (1983) concurs with Spender and suggests that since mathematics is considered a masculine subject, boys especially in co-educational schools are likely to perform better to prove their masculinity. Further, there is pressure on the girls to show "femininity" and since mathematics is "unfeminine", they tend to shun the subject. However, Garret (1983) argues that girls in single sex schools are likely to perform better in mathematics than their counterparts in co-educational schools. It is on the basis of these studies that the conceptual framework was formed.

From the above theories and studies, boys in boys-only schools were expected to perform slightly lower than boys in normal mixed schools. However, those from mixed-sex segregated streams were also expected to perform slightly lower than those from normal mixed-sex streams. In contrast, girls from girls-only schools were expected to perform better than those from normal mixed schools. Girls from mixed sex segregated streams were expected to perform better than those from normal mixed streams.

In comparison to boys, it was expected that girls from girls-only schools would compete closely with boys from all the three categories of schools. In fact they were expected to do better than boys from mixed segregated streams. However, girls from normal mixed schools were expected to perform poorer than boys from

all categories of schools. It was hoped however, that those from mixed segregated streams would compete closely with boys from mixed segregated streams. Figure I illustrates the link between performance and streaming by gender.

The following sets of variables in relation to students' performance in mathematics in the various school types formed the structure of the conceptual framework for the study.

- (i) Streaming by gender: This formed the independent variable for the study. Streaming referred to the act of assigning students to various mathematics classes on the basis of their gender. In the proposed study, streaming in the four types of schools was studied. These were; mixed segregated schools, normal mixed schools, boys' only and girls' only schools.
- (ii) Students' performance in the KCSE mathematics examinations formed the dependent variable. According to Burchfield (1989), performance is the observable and measurable behaviour of a person in a particular situation or experiment. In this study, students scores obtained in the KCSE mathematics examinations were used to indicate performance. The letter grades (A, A-, B+, B, B-, C+.. E) in the KCSE mathematics examinations were translated to a twelve-point scale.
- (iii) Teacher's qualifications and experiences, students' gender, age and ability, teaching resources and facilities formed the extraneous variables of the study. These variables could positively or negatively affect students' performance in secondary school mathematics. These variables were controlled by the research design.

## Conceptual Framework

Figure 2 is a diagrammatic representation of the conceptual framework of the study.,

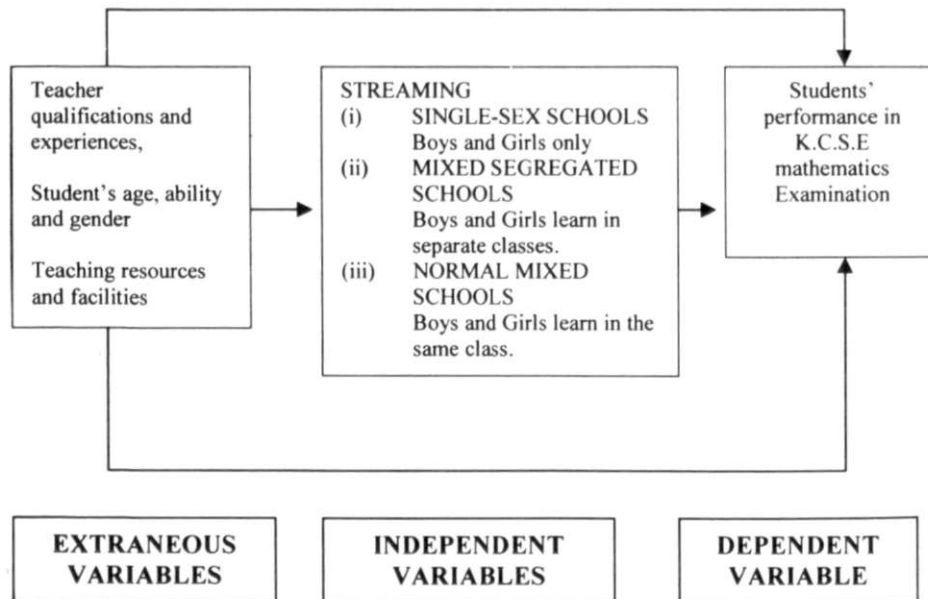


Figure 2: *Conceptual framework for the various types of streaming in various school types in relation to students' performance in mathematics in Kenya's secondary schools*

This framework shows that the extraneous variables together with the types of mathematics classes that students learn in can positively or negatively affect their performance in K.C.S.E mathematics examinations. The scores obtained by students in the examinations measure this performance.

## Results and Discussion

The results are presented in tabular form. An interpretation of the results follows immediately below each table. This highlights the findings followed with a brief discussion of each finding.

## **A Comparison of Students' Performance in Mathematics in Mixed Sex Segregated, Normal Mixed Sex and Single Sex Schools (Boys' only and Girls' only)**

The results of the comparison are summarised in Table 5.

**Table 5: Comparisons of Mean Scores and SD in K.C.S.E Mathematics Examination Results by School Type (2000 & 2001)**

School Type	N	Mean score	SD
Girls' only	174	5.8793	2.8955
Boys' only	242	6.6570	3.4512
Mixed sex segregated	495	6.5475	3.3192
Mixed sex Normal	320	8.6781	2.8184

Table 5 shows that in the years 2000 and 2001 the mean score of students in the normal mixed-sex school is higher followed by those in boys' only, mixed-sex segregated and lastly girls' only. This shows that students in the normal mixed school performed better than the other students in mathematics. One-way ANOVA was calculated in order to determine whether the differences in mean scores were significant. The results of the ANOVA,  $F=41.525$  at  $p<0.05$  show that the differences in the mean scores of students in the four types of schools were statistically significant.

A post-hoc multiple comparison test using Tukey's-Honest Significant Difference (Tukey USD) was done in order to determine the direction of the difference. An analysis of the mean differences using Tukey's-Honest Significant Difference (THSD) test revealed that the mean scores obtained by the students within the following school types were not statistically different at  $p<0.05$ .

1. Girls' only and boys' only.
2. Girls' only and mixed sex segregated.
3. Boys' only and mixed sex segregated.

However, the mean scores obtained by students within the following school types were statistically significant at  $p<0.05$ .

1. Students in normal mixed sex school scored significantly higher than those in girls' only school.
2. Students in normal mixed sex school scored significantly higher than those in boys' only school.
3. Students in the normal mixed sex school scored significantly higher than those in the mixed segregated school.

This suggests that students in the normal mixed-sex school outperformed other students from the other types of schools in mathematics. In view of the findings, first null hypothesis was rejected. This implies that there is a significant difference

in performance in mathematics among students in mixed sex segregated, normal mixed-sex and single sex schools (girls' and boys' only).

### **Comparison of the Performance of Girls in Mathematics by School Type**

The scores obtained by girls in mathematics in K.C.S.E examinations for the years 2000 and 2001 in three types of schools namely; mixed-sex normal, mixed-sex segregated and girls' only, were used to ascertain whether or not there was a statistically significant difference in performance in mathematics among girls in the three types of schools. This was meant to test the hypothesis that there was no statistically significant difference in performance in mathematics among girls by school type. The results obtained are reported in Tables 8 and 9.

**Table 6: Mean score and SD in K.C.S.E. Mathematics Examinations Results for Girls by School Type (2000 & 2001)**

<b>School Type</b>	<b>N</b>	<b>Mean score</b>	<b>SD</b>
Girls' only	174	5.8793	2.8955
Mixed sex segregated	107	5.9346	3.1571
Mixed sex normal	78	7.7308	2.8498

Results in Table 6 show that the mean scores of girls in the girls' only and mixed-sex segregated schools were similar while that of girls in the mixed-sex normal school is higher. This suggests that girls in the mixed-sex normal school outperform other girls in mathematics. In order to determine whether the difference in mean scores were significant one way ANOVA was performed. The F value of 11.36 at  $p < 0.05$  indicates that the mean scores of the girls in the 3 school types were significantly different. In order to determine the direction of the difference, a post hoc multiple comparison test using the Tukey's HSD was performed.

The results reveal that the mean scores obtained by girls in the mixed-sex normal school were significantly higher and different from those obtained by girls in mixed-sex segregated and girls' only schools. However, the mean scores obtained by girls in mixed sex segregated and girls' only schools were not statistically significantly different. This implies that girls in the normal mixed-sex school outperformed the other girls in mathematics, while the performances of girls in girls' only and mixed sex segregated schools in mathematics were similar.

This finding agrees with Opare (1996) who found that though girls in general are less likely than boys to choose science and mathematics; those in all-female schools are much less likely to do so than their counterparts in mixed sex schools. The mixed sex class environment tends to encourage girls to study and pass in

mathematics. This could be an indication that the mixed sex classroom environment encourages girls to study and pass in mathematics.

It could also explain the results of the study which indicate that girls in mixed-sex normal classes perform better than girls in the other types of schools. Knupfer, Rust and Mahaoney (1997) found that mixed sex classrooms are very important in helping boys and girls to learn to work together as they model the behaviour they will need as adults. Besides this, Gloeckner (1994) supports mixed sex classes by arguing that boys and girls possess different perspectives and experiences that will help them to grow and mature. Elsewhere, Lepore and Warren (1997) found that the performance of girls in mathematics did not change when taught in single-sex classes; from co-educational classes. Riordan (1990) supports this view, he found that girls view the single-sex environment as conducive for learning but there is no significant gain in their performance in mathematics in single sex schools. However, this findings contradict previous research by Githua (2002) and Pamela (2000) who found that the normal mixed mathematics classes inhibit the performance of girls in the subject.

### **Comparison of the Performance of Boys in Mathematics by School Type**

To achieve the above objective, the scores obtained by boys in mathematics on the K.C.S.E. examinations for the years 2000 and 2001 in normal mixed-sex, mixed-sex segregated and boys' only schools were used to ascertain whether or not there was a significant difference in performance in mathematics among boys in the three types of schools. The purpose was to test the hypothesis that there was no significant difference in performance in mathematics among boys by school type. The results obtained are presented in Tables 7.

**Table 7: Mean Scores and Standard Deviation (SD) of Boys in Mathematics by School Type (2000 & 2001)**

<b>School Type</b>		<b>Mean score</b>	<b>SD</b>
Boys' only-	242	6.6570	3.4512
Mixed sex segregated	388	6.7165	3.3468
Mixed sex Normal	242	8.9835	2.7450

The results in Table 7 indicate that the mean scores obtained by boys in boys' only and mixed-sex segregated schools were similar while those obtained by boys in normal mixed-sex schools were relatively higher. This suggests that boys in the normal mixed sex school outperformed the other boys in the other types of schools in mathematics. To determine whether the difference in mean scores was significant one way, ANOVA was computed.

An F-value of 10.381 at  $P < 0.05$  shows that the differences among the mean scores of boys in the three types of schools were statistically significant. A *post-hoc*

multiple comparison test using Tukey's Honest Significant Difference (HSD) showed that the mean scores obtained by boys in the normal mixed school were significantly higher and different from those obtained by boys in mixed-sex segregated and boys' only schools.

However, there were no significant differences in performance in mathematics between boys from the boys' only school and those from the mixed-sex segregated school. These findings suggest that boys from normal mixed-sex schools performed better in mathematics than all the others. Therefore the null hypothesis was rejected. This implies that there was a significant difference in performance in mathematics among boys in mixed-sex segregated, normal mixed-sex and boys' only schools.

These findings are in line with those of Lee and Lockheed (1990), Spender (1980) and Eshiwani (1983). Spender (1980) argues that in co-educational schools, the presence of girls is necessary in order to promote the positive image of boys. Further, Eshiwani (1983) argues that since mathematics is considered masculine, boys especially in normal mixed classes will perform better to prove their masculinity. In contrast, Githua (2002) found that boys in boys' only classes were more motivated during mathematics teaching and learning. This high motivation has failed to translate into improved performance of boys in an all-male's class. This was confirmed in a study by Lepore and Warren (1997). They found that boys in single sex schools performed significantly less well than those in mixed normal schools.

### **Effect of Segregation by Gender on Students Performance in Mathematics**

In order to respond to this objective, K.C.S.E mathematics examinations results were obtained for the years 1999, 2000 and 2001 in the mixed-sex segregated school. Students scores obtained in 1999 were compared with those obtained in 2000 and 2001. This is because in 1999, students did the K.C.S.E. examinations when boys and girls were being taught in the same class. In 2000 and 2001, students did K.C.S.E examinations where boys and girls were taught in separate classes. The purpose was to test the hypothesis that there was no significant improvement in performance in mathematics when students were segregated by gender. The results obtained are summarised in Table 8.

Table 8: Comparison of the Mean Scores and Standard Deviations (SD) of Students in the Mixed sex Segregated School for the Years 1999, 2000 and 2001

<b>YEAR</b>	<b>N</b>	<b>MEAN SCORE</b>	<b>STANDARD DEVIATION</b>
1999	258	5.3992	3.1647
2000	234	6.4957	3.2284
2001	261	6.5939	3.4042

The results summarised in Table 8 indicate that the mean scores of students in the mixed-sex segregated school in mathematics were higher when the students were taught separately. The overall results improved from 5.4 in 1999 to 6.6 points in 2001. The mean scores of boys and girls were also compared separately for the three years as shown in Table 9.

**Table 9: Mean Score and SD in K.C.S.E Mathematics Examination Results in the Mixed Segregated School by Sex. (1999, 2000 and 2001)**

Year	Boys			Girls		
	N	Mean score	SD	N	Mean score	SD
1999	180	6.1222	3.2316	78	3.7308	2.2602
2000	182	6.6044	3.2052	52	6.1154	3.3116
2001	206	6.8155	3.4718	55	5.7636	3.0244

Results shown in Table 9 indicate that the mean scores of both boys and girls in mathematics were higher when they were taught mathematics in separate classes than when they were taught in the same class. Girls' performance in particular improved significantly after segregation. This implies that streaming by gender in mixed-sex segregated schools led to improved performance of both boys and girls in mathematics. To determine whether the above mean scores were significantly different, a single t- test was performed.

The t-value for 1999 and 2000 ( $t=-3.801$ ) and that of the years 1999 and 2001 ( $t=-4.139$ ) were statistically significant at  $p<0.05$ . These results imply that the performance of students in the mixed sex segregated school had improved. This is attributed to streaming by gender in the school. Further t-tests were done on results obtained by boys and girls.

An examination of the results in the case of girls indicates that the t-values of years 1999 and 2000 ( $t=-4.882$ ) and that of the years 1999 and 2001 ( $t=-4.436$ ) were statistically significant at  $p<0.05$ . The girls scored higher in separate classes compared to when they were taught together with boys in the same classes. This suggests that the performance of girls in mathematics had improved. This improvement could be attributed to streaming by gender in the mixed-sex segregated school.

The results further indicate that in the case of boys, the t-value of the years 1999 vs. 2000 ( $t=-1.425$ ) was not statistically significant at  $p<0.05$  while that of 1999 vs. 2001 ( $t=-2.021$ ) was statistically significant. This implies that whereas both boys and girls improved in performance in mathematics, girls benefited most as a result of streaming by gender. Therefore the hypothesis that there was no statistically significant improvement in performance in mathematics when students are segregated by gender is rejected.



Earlier studies, notably Costello (1991), Garret (1987) and Githua (2002) have argued that girls are motivated and therefore have advantage in learning mathematics in single-sex classes. This is translated into a better performance in the subject. The findings of this study are consistent with their findings. The study found that the mean scores of girls in mathematics increased when they were taught in separate classes from boys. This finding, however contradicts Lepore and Warren (1997) who found that girls experienced no statistically significant positive effects of single-sex environment.

In addition, this study found that separation by gender in mathematics classes led to improved performance of boys in the subject. However the improvement was not statistically significant. This finding is in line with Lepore and Warren (1997), who found that boys in single sex schools did not increase their mathematics test scores more than in mixed sex classes. The results contradict those of Lee and Lockheed (1990) who found that the performance of boys when taught in single sex classes is likely to decline.

### **Comparisons of the Performance in Mathematics of the Various Groups of Boys and Girls in the Three Types of Schools**

The study compared mean scores obtained in mathematics by various groups of boys and girls in the three types of schools. The study further compared mean scores obtained in mathematics by boys and girls within the same type of school (see Table 10).

Table 10: Mean score and SD in K.C.S.E. Mathematics Examinations results for the various groups of boys and girls in the three types of schools

School type		N	Mean score	SD
Mixed sex normal	B1 (Boys)	242	8.9835	2.7450
	G1 (Girls)	78	7.7308	2.8498
Mixed sex segregated	B2 (Boys)	388	6.7165	3.3468
	G2 (Girls)	107	5.9346	3.1571
Single sex	B3 (Boys)	242	6.6570	3.4512
	G3 (Girls)	174	5.8793	2.8955

The results shown in Table 10 indicate that in the case of boys, the mean score obtained by those in the mixed-sex normal school was higher followed by boys in mixed-sex segregated and lastly boys in the boys' only school. In the case of girls, the results indicate that girls in the mixed-sex normal school obtained the highest mean score followed by girls in the mixed-sex segregated school and lastly girls in the girls' only school. This suggests that boys from the mixed-sex normal school performed better in mathematics followed by boys from the mixed-sex segregated school and lastly those from the boys only school.

Further, the results suggest that girls from the mixed-sex normal school out performed other girls in K.C.S.E mathematics. They were followed by girls from the mixed sex segregated school and lastly girls from the girls' only school. To determine whether the differences in mean scores were statistically significant, single t-tests were computed and results summarised in Table 11.

Table 11: Single t-test of Mean Scores Obtained by Sex and School Type (2000 & 2001)

Groups	t-value	d.f	P- value
B1 vs G1	3.472*	318	0.001
B1 vs B2	-8.843*	332	0.000
B1 vs G2	9.128*	347	0.000
B1 vs B3	-8.207*	482	0.000
B1 vs G3	11.118*	414	0.000
G1 vs B2	-2.500*	464	0.013
G1 vs G2	-3.980*	183	0.000
G1 vs B3	-2.487*	318	0.013
G1 vs G3	-4.715*	250	0.000
B2 vs G2	2.165*	493	0.031
B2 vs B3	-0.214	628	0.830
B2 vs G3	2.855*	560	0.004
G2 vs B3	1.850	347	0.065
G2 vs G3	-0.150	279	0.881
B3 vs G3	-2.422*	414	0.016

Means statistically significant at  $P < 0.05$  level.

The results in Table 11 indicate that there were significant differences between the following groups of students.

1. Boys and girls in normal mixed schools.
2. Boys in normal mixed sex and mixed sex segregated schools.
3. Boys in normal mixed sex and girls in mixed sex segregated school.
4. Boys in normal mixed sex and boys' only schools.
5. Boys in normal mixed sex and girls in girls' only schools.
6. Girls in normal mixed sex and boys in mixed sex segregated schools.
7. Girls in normal mixed sex and girls in mixed sex segregated schools.
8. Girls in normal mixed sex and boys in boys' only schools
9. Girls in normal mixed sex and girls' only schools.
10. Boys and girls in mixed sex segregated schools.
11. Boys in mixed segregated sex and girls in girls' only schools.
12. Boys in boys' only schools and girls in girls' only schools.

The results further indicate that there were no significant differences between the following groups of students.

1. Boys in mixed sex segregated and boys' only schools.
2. Girls in mixed sex segregated and boys in boys' only schools.
3. Girls in mixed sex segregated and girls in girls' only schools.

The results suggest that there are statistically significant differences in performance in Mathematics between boys and girls within the same type of schools. Boys scored significantly higher than girls in mixed-sex normal, mixed sex segregated and single-sex schools. This suggests that despite the type of school and Mathematics classes that learners are taught in, boys continue to perform better than girls. This finding is in line with Eshiwani (1984) who found that at the secondary level of education, boys frequently outperform girls in Mathematics. Makau (1994) and Obura (1991) further agree with this finding. They found that these differences begin to appear at upper primary school level and increase at secondary school.

The performance of boys and girls in the mixed normal school was higher compared to the others. The results indicate that they scored significantly higher than boys and girls from mixed segregated and single-sex schools. Spender (1980) in Garret (1987) and Eshiwani (1983) argue that the presence of girls in mixed-sex normal schools is necessary in order to promote the positive image of boys. Eshiwani (1983) further argues that since mathematics is considered masculine, boys in such schools are likely to perform better to prove their masculinity. This may perhaps explain why boys performed better in the subject than other boys and girls in the other types of schools.

In addition Opere (1996) found that girls in mixed schools are more likely than their counterparts in an all-girl's class to choose science and mathematics. This implies that mixed sex schools encourage girls to study and pass in mathematics. This may perhaps explain why girls in the mixed-sex normal school were superior in performance in K.C.S.E mathematics followed by those in mixed segregated and lastly those in girl's only school.

It could explain why boys in the normal mixed school were superior followed by those in mixed segregated and lastly those in boys'only schools. Therefore these findings agree with Garret (1983) and Opere (1996). However they contradict those of Githua (2002) and Pamela (2000) who found that the normal mixed mathematics classes inhibit performance and especially that of girls in mathematics.

### **Effect of Streaming by Gender on Student' Performance in Mathematics**

This study was interested in finding out whether in the opinion of teachers, streaming by gender-improved students' performance in mathematics and especially that of girls. Table 12 shows the views as expressed by teachers.

**Table 12: Response to the Question 'Can Streaming by Gender Improve Students Performance and Especially that of Girls in Mathematics?'**

Statement	N	%
Yes	13	59
No	6	27
Undecided	3	14
<b>Total</b>	<b>22</b>	<b>100</b>

Majority (59%) of the teachers were of the opinion that streaming by gender improves students' performance and especially that of girls in mathematics. This indicates that separate mathematics classes for boys and girls favour students and especially girls in learning the subject. This agrees with Bellman (1997) and Hagan (1998) who note that single-sex classes result in greater academic performance of girls. They attributed this performance to higher self-esteem and confidence built in these classes. Sadker and Sadker (1994) are also in agreement with these views. They found that girls in single sex schools achieve more, have higher self esteem and are more interested in subjects like mathematics and science. Nemco (1998), Gerrity (1994) concur with Sadker and Sadker (1994) by arguing that such classes encouraged females to take 'harder' subjects such as mathematics. In particular Gerrity (1994) reported that females in single-sex schools take mathematics and science courses at double the national average. This may explain why the performance of girls in mathematics in the mixed-sex segregated school improved after streaming by gender.

However, 27% of the teachers indicated that streaming by gender alone could not improve student's performance and especially that of girls in mathematics. The teachers indicated that negative student's attitude and especially that of girls towards the subject led to the lower performance in mathematics. Negative attitude lowers their motivation to learn the subject and their mathematics self-concept. Githua (2002) argues that these are critical in determining students' performance in mathematics. Lastly, 14% of the teachers were unsure whether streaming by gender improves students' performance in mathematics. This may be an implication that these teachers had no experience of teaching mathematics in mixed-sex normal classes and could not give a concrete answer.

## **Conclusions and Recommendations**

### **Conclusions**

There are a number of implications that can be inferred from this study. Although streaming by gender led to improved performance of girls in the mixed-sex segregated school, this performance is lower than that of girls in the mixed-sex normal schools. However, their performance is similar to that of girls in girls' only schools. This suggests that the mixed-sex normal school could be doing something different that can be reproduced both in mixed-sex segregated and girls' only

schools. Teachers pointed out strict supervision of students, a high degree of discipline in the school and an abundance of teaching resources. Strict supervision and a high degree of discipline could, in a way, make students concentrate more on academic activities hence their improved performance in mathematics.

From the study, it is evident that there is a statistically significant difference in the performance of boys and girls in all the three types of schools. Boys perform better than girls. This means that despite the type of school that learners attend, boys continue to outperform girls in mathematics. The findings have shown that boys from mixed sex segregated, mixed sex normal and single sex schools perform better than girls from the schools in mathematics.

The findings have also shown that since mathematics is offered as a compulsory subject in the secondary schools curriculum, some students were doing it yet they did not like the subject. Therefore they developed a negative attitude towards it. This could contribute to poor performance.

### **Recommendations**

In view of the conclusions, the following recommendations were made:

1. Majority of the teachers indicated that streaming by gender alone might not improve the performance of students in mathematics. In view of this, teachers should strive to change the attitude of students towards the subject. This can be done through equal treatment of both boys and girls while teaching, and avoiding as much as possible gender stereotyped statements in class.
2. In-service courses are necessary if teachers have to teach mathematics well and further help to change students' attitudes towards the subject. This will help the teachers to acquire practical skills that would assist in developing appropriate ways of handling boys and girls in mathematics classes. Such courses would assist in updating teachers on the emerging gender issues in mathematics education. These are necessary in exposing them to new ways of handling boys and girls in the subject.
3. Mathematics teacher-training programmes in both colleges and universities should be reviewed so as to incorporate gender issues. This would assist teacher trainees in equipping them with skills to appropriately handle boys and girls in mathematics teaching and learning.
4. School administrators should make an effort of increasing mathematics counselling sessions to students. This could be done by establishing guidance and counselling desks within schools and inviting guest speakers who have excelled in the subject. By so doing, the negative attitude towards the subject might change, hence encouraging learners to work hard and pass in it. It will also help in motivating them to cultivate a better self-image of themselves.

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**SECTION 3:**  
**ENVIRONMENT, LAND USE AND CONFLICT**  
**MANAGEMENT**

## CHAPTER 12

# TOWARDS MULTIFACETED SYSTEMS OF FOOD SECURITY AND ENVIRONMENTAL MANAGEMENT DURING RE-INTEGRATION OF VICTIMS OF CONFLICTS IN SOUTHERN SUDAN

*Stephen Njoka Nyaga*

### **Abstract**

Sudan is the largest Country in Africa. It is inhabited mainly by black Africans to the South and Arabs to the north. The southern region is the richest in valuable mineral resources. This is partly one of the factors that exacerbate the recurrent inter-religious, inter-ethnic, economic and political conflicts. The peace accord signed in Naivasha, Kenya in January 2005 to end the five decades of violence provides hope to victims of conflicts within Sudan and in Diaspora. However, majority of the refugees are currently exhibiting a lot of apprehension, uncertainty and hopelessness over their fate after repatriation.

The paper is based on secondary and primary data collected through oral interviews with religious and community leaders in Kakuma Refugee camp, some project officers working for UNHCR and other humanitarian organisations. It focuses on the Nuer community in Western Upper Nile region, Southern Sudan. This is one of the largest ethnic groups in Southern Sudan.

The paper begins by highlighting geographical and demographic information on the Southern Sudan, impact of conflicts on food security in southern Sudan, challenges of repatriation/re-integration of victims of conflicts in the New Sudan particularly efforts to provide the returnees with formal and informal skills of sustainable livelihoods in agriculture, fisheries and agro-processing. It exemplifies that indeed refugees, Internally Displaced Persons (IDP) and returnees are impoverished and encounter food insecurity. The discussion shows the need to integrate formal and informal environmental education into the systems of management of natural resources like soils, fish resources, flora and fauna.-

The paper recommends multifaceted strategies of psycho-social healing and empowerment of the Nuer community on sustainable modes of supporting their livelihood. Such strategies focus on capacity building of local communities and religious leaders to support the initiated programmes. The ultimate goal is to enhance re-integration, food security and sustainable management of natural resources in all processes of socio-economic development.

## **Introduction**

According to FAO (1995) 'food security' means ensuring that all people at all times have the access to food they need for a healthy active life. 'Community Food Security' is the state in which all persons obtain a nutritionally adequate and culturally accepted diet at all times through local production without emergency sources. This definition broadens the traditional concept of hunger, embracing a systematic view of the causes of hunger and poor nutrition within a community while identifying the changes necessary to prevent their occurrence.

Food insecurity and famine punctuate Southern Sudan's history. The situation is alarming given that food related crises can be traced to as far back as 1955 when the first civil war broke out in the Eastern Equatorial region of Southern Sudan. Notably, the Peoples Liberation Movement and Army (SPLM/A) forces use the Nile region as their base. The area is the corridor to Ethiopia and back, hence the route for mobilisation of SPLA forces. A majority of the population in Bhar El Ghazal and Nuba Mountains used to feed from this region before the split of SPLA in 1991. The effect of this is the emergence of food insecurity and the depletion of natural resources including flora and fauna, arable soils and water resources.

During the war (1955), there was a high degree of erosion of human dignity and values. This resulted into the disintegration of indigenous cultural values and social systems which had earlier on fostered community cohesion; environmental norms that enhanced controlled harvesting of forest products, protection of water sources, discriminative fishing, and sustainable farming practices and other forms of responsible utilisation of natural resources. In 1997, several Southern rebel factions signed the Khartoum Peace Agreement with the Sudan Government. However, this did not end the recurrent inter-religious and socio-political conflicts in Southern Sudan.

In the process of re-integrating internally displaced persons (IDP) and refugees/returnees, one of the challenges the new Sudan government faces has to do with the rebuilding of the social order, socio-cultural and economic patterns and retracing people's dignity (Arrupe 1982; Nyaga and Kariuki 2005).

Perhaps one of the most dehumanising aspects of poverty in Southern Sudan is food insecurity among people who were once self-sufficient in food stuff (Kuirthoi and Chetiem 2005). In this respect, no major break-through has been made to combat the problems of food insecurity in Southern Sudan (CMCM 2005). This problem is more pronounced in Western Upper Nile region where majority of the people have inadequate and uncertain access to food for a healthy life.

## **Socio-economic Challenges of the Nuer Community in Southern Sudan**

With an approximate area of 1,000,000 square kilometres, Sudan is the largest Country in Africa, and lies between the longitudes of about 23° East to 39° East and latitudes 4° North to 22° North. Sudan is located in the heart of Africa and is a neighbour to many countries. They include; Egypt to the North, Eritrea to the North-East, Ethiopia to the East Kenya and Uganda to the South, DRC-Congo and Central Africa Republic to the South West and Chad together with Libya to the West. It has a population of 25- 30 million people and is inhabited mainly by black Africans and Arabs. About 40% of the country's population lives in the South and is mainly black Africans who are Christians, while the majority of the Arabs are Muslims and live in the North.

This paper highlights the challenges of food insecurity and environmental degradation among the Nuer community which lives in the Western Upper Nile Region. Upper Nile is located on the Northern part of Southern Sudan. It is further divided by River Nile into two sub-regions of Eastern and Western Upper Nile. For administrative purposes, the Upper Nile region is divided into four states, namely, Latjuor, Biech, Phou and Liech. The issues affecting the Nuer and possible interventions can be replicated in other regions of Southern Sudan. These include Bhar-El Ghazal in the West and Equatorial in the South.

The Upper Nile is endowed with varied natural resources such as petroleum, uranium, gold, copper, natural gas, diamond, zinc and white wash and fertile soils suitable for crop production and livestock keeping. Main crops grown include; maize, beans, sesame, okra, sorghum, cassava, millet, groundnuts and fruits like citrus, mangoes, pineapples and paw paws. This paper focuses on sustainable agricultural practices and management of environment in the process of combating poverty and food insecurity.

The study forms the basis of this paper and is based on the contention that after the signing of the peace agreement between the Arab-led government of Khartoum and the Sudanese People Liberation Army/Movement (SPLA/M) in Southern Sudan, there exist complex challenges for the people in Southern Sudan that revolve around unsustainable livelihoods. These include: the socio-political reorganisations to enable the communities in Southern Sudan to address the varied challenges of adopting sustainable re-integration of different categories of victims of conflicts such as combatants and non-combatants; remnants and internally displaced persons, local and international refugees. In addition there exist environmental and economic challenges related to food insecurity and poverty facing many communities in Southern Sudan. In the light of such a precarious situation the discussion, focuses on the multifaceted systems of enhancing food security and sustainable environmental management during the re-integration of the victims of conflicts in Southern Sudan.

## **Methodology**

This paper is based on the qualitative study that relied heavily on secondary data collected through library research. Published and unpublished materials in libraries in Nairobi, UNHCR and other relevant resource centers and electronic sources were reviewed. In addition, primary data was collected among the refugees from the Nuer ethnic group in Kakuma refugees' camp. This camp hosts majority of the Sudanese refugees in Kenya.

The field data was collected during a series of workshops attended by prominent community and religious leaders on the principles of peace building, conflict management and leadership development. The training sessions were organised within Kakuma refugees' camp in May 2005 as part of the initiatives to prepare groups of Sudanese refugees for repatriation after the signing of the peace treaty between the Arab led government in Khartoum and the SPLM/A in Southern Sudan. The workshops were supported by the Christian Mission and Continuous Ministries (CMCM) and Diocese of Malakal of the Episcopal Church of Sudan, in conjunction with Lutheran World Federation and UNHCR. Special attention was given to the Nuer community who were the majority in the above workshops.

The data pertaining to the socio-economic, political and environmental impact of the wars in Southern Sudan was collected through formal and informal techniques during the workshop sessions. This enabled the researcher to gather authentic data on the plights of refugees, remnants and returnees in Upper Nile Region in Southern Sudan. Where possible, the researcher carried out individual interviews and Focus Group Discussions (FGDs). This facilitated collection of data which is treated by some refugees as either politically sensitive or personal.

Altogether forty (40) respondents were interviewed on varied issues related to food insecurity, psychological and socio-economic challenges facing the returnees in Southern Sudan, perceptions towards the anticipated repatriation and possible strategies of undertaking sustainable re-integration of the refugees and remnants in Southern Sudan. In addition, the interview sessions gathered data on the informants' awareness of the sustainable agricultural practices and conservation of natural resources.

The main categories of informants interviewed include: (a) Former political leaders and civil servants, (b) Sages (tribal/ethnic and clan leaders), (c) Faith based leaders (including Priests and lay church leaders), (d) community based self management committee (CBO) leaders, (e) Women and youth leaders. Qualitative skills of data analysis and presentation were applied. This involved interpretation, synthesis and integration of primary data with the secondary data from library sources. The main findings were thematised and presented as exemplified under the main sections of this paper.

## **Results and Discussions**

### ***Impact of Conflicts on Food Security in Southern Sudan***

The physical and social consequences of armed conflicts on the affected Sudanese are alarming. Other than displacing many people from their families and communities, the war in Sudan has left its victims tortured and starved to death. Further it has created physical and emotional wounds that have left psychological scars on the victims. Consequently, many individuals are traumatised, disillusioned, economically and socially disoriented due to their past experiences in the war. Others are bound by religious rituals that they may have undergone during recruitment (Smith 1994; Specht 2000).

Whether refugees, Internally Displaced Persons (IDP) and returnees were once combatants or non-combatants, many people in Sudan are faced with numerous problems after the war. The effects are in social, economic, political, and cultural spheres of their lives (Assefa and Wachira 1996). Indeed most of the returnees are impoverished and encounter food insecurity. This has made many Sudanese to seek asylum in neighboring countries. In view of this, their social healing, socio-economic empowerment and capacity building on sustainable modes of supporting their livelihood is imperative (Nyaga and Kariuki 2005). This is a concern for all stakeholders in post-conflict reconstruction and re-integration processes.

The above impact of civil wars in southern Sudan made it very challenging for the farmers to settle down and carry out the agricultural activities (Kuirthoi and Chetiem 2005, 2). Thus, displacement was inevitable and led to massive disruption in food production, poor health and enormous loss of livestock through collapse of veterinary services and slaughter of animals as food stock ran low (UNEP 1997; FAO 1998; ICRC 2005). Many people in Southern Sudan were rendered poor and malnourished. Further, inaccessibility to agro-based credit facilities resulted in major hindrances to the progress of attaining food security in many parts of Southern Sudan.

The United Nations High Commission for Refugees (UNHCR), Food and Agriculture Organisation (FAO), World Food Programme (WFP), Lutheran World Federation (LWF), Food for Hungry, Food for Assets and other organisations have employed various methods of assistance and reconstruction, particularly provision of limited basic needs and resettlement in other countries (Church World Services, 2004). However their concern is more on provision of food and medical supplies than in jump-starting the agro-based economy and rehabilitation of the degraded natural resources due to war-related activities.

The above situation shows that Southern Sudan has been consistently below food requirements for the last 50 years. Today over 5 million people lack sufficient food, are unable to lead healthy and active lives (CMCM 2005; ICRC 2005).

Without feasible interventions, hunger, poverty and malnutrition will continue to undermine the lives of people in Western Upper Nile. We must honor our responsibility as the custodians to conserve natural environment while accepting the challenge of securing food for all.

Kuirthoi and Chetiém (2005; 2-3) have analysed the nature of the major constraints to sustainable agriculture and management of available natural resources. They have cited the following constraints:

- The civil wars which have displaced most people and over-engaged them in fighting. In this regard, there has been an erratic inter-tribal conflict due to frequent shift in political and military alliances of the factions allied to Nuer and Dinka communities, the predominant ethnic groups in Southern Sudan.
- There has been recurrent drought due to uneven distributions of rainfall. This has often led to crop failure and famine. Notably, there is lack of national food reserves. As a result, over 60% of the children suffer from high levels of malnutrition, morbidity and mortality.
- Consistent floods in some sections of the Upper Nile have wiped out livestock, and displaced about 70% of the population. This has disrupted mainly agricultural activities in several counties in Southern Sudan.
- Perhaps the major challenge to the agricultural sector is the fact that approximately, 90% of the farming communities in Southern Sudan lack modern farming techniques. This is because of lack of skilled agricultural extension workers.
- Low level of development in agricultural and environmental education is linked to lack of proper integration of agricultural and environmental education in primary education system, inadequate secondary education facilities and opportunities, and lack of tertiary and/ or vocational training on sustainable knowledge and skill of environmental management.

### ***Psychological and Socio-Economic Challenges of Re-integration of the Refugees***

The results show great challenges of repatriation/re-integration of victims of conflicts in the New Sudan. Specifically, efforts to provide the returnees with formal and informal skills of sustainable livelihoods in agriculture, fisheries, agro-processing and entrepreneurship have encountered varied logistical problems.

In essence, the returnees, Internally Displaced Persons (IDP) and remnants are in triple jeopardy having suffered physical, psychological and socio-economic maladjustment. To restore their human dignity, they need intensive intervention strategies including physical resettlement, knowledge and skills for survival and most important, psychosocial reconstruction.

There is need to improve their farming/fishing skills to enhance production without depleting available natural resources like soils, water, flora and fauna as

seen earlier. This is necessary in order to rekindle the capacity of local communities in managing all the stages involved in crop/livestock/fish production. It is realized that more inputs will be necessary in the area as influx of returnees and IDPs is expected to rise with the signing of the peace agreement in 2005.

Such a programme should aim at enriching the skills of harvesting, processing and marketing crops which are viable in different localities. With regard to the Nuer community repatriation and resettlement programme, the UN agencies as well as local NGOs like UNCCMCFE and CMCM, in Western Upper Nile region should continue providing material capital in form of farm inputs like seed supplies (such as okra, pumpkin, maize, sorghum, watermelon, tomatoes, sesame and varied vegetables).

Agro-forestry projects should also be initiated in order to rehabilitate the degenerated forestlands. The project should endeavor to incorporate appropriate skills of livestock (cattle, goats, sheep and poultry) production. For all these activities, there will be need to improve the availability of farming tools (malodas, pick-axes, shovels, axes, hoes, machetes and sickles) to the returnees. It should also go hand in hand with the provision of appropriate agro-chemicals (biocides, fertilisers and manure) to the local communities.

Ultimately, the programme should aim at enriching the skills of farming; harvesting, processing and marketing to foster sustainability of the agricultural industry and to jump-start the agro-based economy of the people in Western Nile region.

### **Fundamental Issues in Planning Education of Victims of Conflicts**

It should be noted that most refugees have not had the opportunity to pursue formal education due to the disruptions caused by wars. The general qualification of most people including community and religious leaders is primary education. However, some people have secondary and tertiary education. This implies, that the curriculum and methods of teaching/facilitation should consist of formal and informal techniques to cater for participants of varied mental abilities, age, academic and socio-cultural backgrounds.

The induction programmes should for instance apply participatory techniques in the training of personnel. In addition, we propose establishment of model farms and livestock demonstrations within Kakuma Refugee camp and at Leer region to target remnants and other IDPs. These would serve as Farmers Training Centers (FTCs) and eventually those in Sudan could be upgraded to Agricultural Training Institutes (ATIs). Other new expandable technologies could be transferred to the farmers through Farmers Field Schools (FFS) to be established in various settlement sites.



Other important ideals of education targeting refugees and returnees should incorporate the following:

- Restoring the human dignity, provide hope, safe life and guarantee food security to the thousands of people of Western Upper Nile in Leer Country.
- Promotion of peace building and post-conflict reconstruction among refugees, IDPs and returnees. Such an endeavour requires local community and religious leaders to have basic skills of psychological and pastoral counselling. This makes it possible for all victims of conflicts with post traumatic stress disorders to have culturally acceptable therapeutic services from their localities.
- Encouraging self-sufficiency and self-reliance in food production through increased production of staple cereal crops and horticulture products. This would enhance increased agricultural output through improved access to basic farm inputs and extension services.
- Adequate education training of the community leaders, youth leaders, women group leaders and the local church leaders. This will ensure that there are dynamic indigenous organisations and emerging groups which are able to manage the activities of community mobilisation in food production and sustainable livelihoods with little or no outside assistance.

In view of the above, the sustainability of such efforts should put into consideration the current activities of indigenous community based organisations through religious and local community leaders. For instance activities of organisations such as Christian Mission Continuous Ministries (CMCM) which promotes post-conflict reconstruction in refugees camps and subsistence agriculture among returnees and IDPs; and Upper Nile Christian Community Micro Credit Fisheries Enterprise (UNCCMCFE 2003), which source out and distribute fishing gear to the local communities. This shows that socio-religious organisations are important entry points in post-conflict resolutions and reconstruction of refugees, returnees and IDPs.

### **Challenges of Training Programmes in Refugee Camps**

This paper recommends multifaceted strategies of psycho-social healing and empowerment of persons affected by conflicts on sustainable modes of supporting their livelihood. One obvious constraint is the shortage of qualified personnel to train people with variant education, socio-economic, ethnic and religious backgrounds on psychotherapeutic skills.

Sometimes, the composition of participants in different workshops encounters logistical problems related to the socio-political and religio-cultural differences. This happens because Sudanese refugees in the same camp are from different ethnic groups, geographical regions, religious denominations, age and sex. This brings intense conflicts, variant opinions and disagreements in workshops and seminars. It makes the situation worse when some facilitators choose to take sides

in some socio-political factions represented in the camps. In this regard, facilitators should be very sensitive and accommodative when planning workshop activities. The UNHCR security officials have records which show that during training programmes within the refugee camps, inter-tribal violence and socio-political animosity readily elapse due to strong ethnic, political and religious differences among some community and religious leaders. This could be overcome by developing all-inclusive group norms based on virtues of tolerance, forgiveness, accommodation and reconciliation as emphasised in Christianity, Islam and indigenous virtues of reconciliation.

Another constraint of training programmes in refugee camps has to do with language barriers: it was noted that over 70% of participants are illiterate and can hardly use English. This is a limitation to facilitators who come as expatriates (including psychologists, environmentalists, agronomists and other technocrats) and may be incompetent in local Sudanese dialects and the Arabic language. This implies that all training activities should adopt a multi-lingual approach or preferably use interpreters.

## **Conclusion**

This paper underlines the need for preparation of victims of conflict to engage in sustainable economic activities after repatriation from refugee camps. This should take a wholistic approach to address varied needs of participants including psychosocial, economic, political and religious values. Induction programmes should aim at reducing psychological and socio-economic uncertainties of returnees.

It is noted that there is a lot of anxiety among refugees in international refugee camps like Kakuma over their fate after they return to Southern Sudan. This is possibly because they are looked down upon by the IDPs and other remnants in Sudan who perceive them as cowards and opportunists for having run away during the time of war. Other refugees fear returning home in case of retaliation by their antagonists.

Community and religious leaders should be given basic psychological and biblical skills of conflict mediation/ management and post-conflict reconstruction to compliment the varied activities of re-integration and humanitarian assistance from the Government of Sudan and other NGOs such as UNHCR, ICRC, UNICEF, FAO, WFP, Lutheran World Federation, Care International among others. These organisations have varied initiatives on humanitarian services and capacity building of returnees and refugees before they are repatriated (Nyaga 2006).

An example of initiatives of NGOs can be drawn from the efforts of Care International in collaboration with Desmond Tutu Peace Center and ARC Aid/Norad in leadership skills development of young victims of conflicts under emerging leadership programme (ELP). Due to limitation of financial resources

the beneficiaries of the existing programmes are usually very few in relation to the number of affected persons. The Care initiatives is also criticised by elders arguing that an over-emphasis on the youth is misdirected given that in African culture elders are the ones who are entrusted with leadership responsibilities.

Community and religious leaders form crucial support systems at grassroot level given that the returnees, Internally Displaced Persons (IDP) and remnants have all suffered physical, psychological and socio-economic maladjustment. Training on integrated skills of psychosocial healing of the victims of the conflicts is a prerequisite to steer post-conflict reconstruction. It is apparent that conflicts have had a negative impact on agriculture and fish production among the people of the western Upper Nile. In this regard, the conflicts have constrained sustainable management of the existing natural resources and infrastructural development in fisheries and agriculture sectors.

The Church and faith-based organisations should steer viable strategies of jump-starting the agro-based economy through formal and informal skills of sustainable agriculture (integrated land use management) in order to promote food security in Southern Sudan. The Episcopal Church of Sudan has taken a lead in this direction. This will go hand in hand with poverty eradication among subsistence farmers. The NGOs and Church agencies should also search for effective ways of promoting different formal and informal environmental education among Nuer refugees, returnees and IDPs.

It is observed that membership in these CBOs and socio-religious organisations are determined by deep familiarity of those involved. This makes them important entry points of local communities' socio-economic and socio-religious perspectives at grassroot level.

The ultimate goal is to enhance re-integration and sustainable management of natural resources in the process of enhancing socio-economic development and food security. The nuclei of such development programmes could be in the formation of Self Help Groups (SHG), Community/Church Based Organisations (CBO) and other Indigenous NGOs like UNCCMCFE and CMCM.

Currently, the UNHCR proposes to intensify their repatriation programme in October 2007. Notably, the proposed induction programmes to prepare the refugees/ returnees for repatriation have been very slow and at times have encountered great logistical hitches, financial constraints and lack of appropriate technical skills to handle a high number of target groups. As UNHCR attempts to repatriate refugees from the Kakuma camp they still continue to receive more refugees from other parts of Southern Sudan. This is perceived as a psychological setback because it demoralises the refugees/returnees already set for repatriation. One notes a lot of anxiety among the refugees as they try to catch up with the daily social, economic and political developments back in Southern Sudan through the print and electronic media. One can rightly conclude that most refugees in Kakuma

and other camps like Dadaab are reluctant to go home. This further explains why most refugees in Nairobi among other towns in East Africa are busy seeking opportunities of integration within Kenya while others apply for green cards/refugee status to go to Europe, Australia and America among other places.

There is, therefore, need to integrate contemporary formal and informal environmental education into the indigenous Nuer worldview, values and systems of management of natural resources like soils, fish resources, flora and fauna. This would ensure that the agricultural, fishing and environmental management skills are interwoven with local people's knowledge base. However, this aggravate the situation further as it is more difficult for the children and youth born and brought up in International refugees camps to conceptualise the indigenous Nuer world view, values and systems of management of natural resources.

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## CHAPTER 13

# THE DIMINISHING WEALTH: THE CASE OF NYAMASARIA WETLANDS IN KISUMU TOWN

*Daniel O.'Odaro*

### **Abstract**

Wetlands are areas, which are periodically (temporarily or permanently) water-logged because of high water-table. They are diverse habitats which include rivers, lakes, marshes, swamps, floodplains, coastal areas, estuaries, bogs and coral reefs. Due to their vast ecological wealth, wetland ecosystems throughout the world have been modified through conversion into farmlands, sites for settlements and industrial development. Consequently, wetlands have been degraded and even lost in some cases because they are perceived to have little value as compared to other "developments", which yield higher profits both in the short and long run. The most vulnerable are urban wetlands, which have been phased out to give room for industrial developments and urban expansion. The paper examines the impact of urbanisation on wetlands in Kenya. It particularly focuses on the Kisumu urban wetlands with special regard to its recent elevation to city status.

### **Introduction**

Wetland ecosystems have been subjects of controversy by various researchers and scholars. They have been defined differently in different contexts. However, since the Ramsar Convention of 1971, a universally accepted definition was derived and adopted in 1975. Wetlands were defined as areas of marsh or fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water, depth of which at low tide does not exceed six metres (Khan *et al* 1994; 2; Kasoma 2003; 2; Mwanuzi 2003;4). In the Kenyan context, which this paper adopts, wetlands include deltas, estuaries, mangroves and mudflats as well as swamps, marshes, floodplains, shallow lakes and the edges of deep lakes and rivers containing vegetation influenced by light (Abira 1997; 47).

Wetland ecosystems comprise two components, which interact continuously thereby bringing about ecological - and hydrological functions such as biogeochemical cycles, erosion control, silt traps and water purification, recharge and discharge. These components are biotic and abiotic features, and include plants, soils, water and animals.

Wetlands provide great socio-cultural, economic and ecological benefits to the adjacent settlements. These benefits have been grouped into three broad categories

by Moss (1992; 141) as intrinsic, subsistence and commercial values. Residents within and around wetlands draw food, water, medicinal products, handcrafts, fuel wood, building materials and green pasture for their livestock from the habitats. Some of these products are sometimes sold by the local communities for cash, which in turn is used to pay for basic household goods and services such as food, clothing, health care and education.

The wetlands also provide vital sites for communal rituals, rites and ceremonies such as circumcision, baptism, ash drive and sport swimming. Besides, the wetland habitats have numerous ecological functions for the communities where they are found and beyond. These include water purification, sediment trapping, water storage and discharge, storm protection and wind break, maintenance of nutrient recycling, shoreline stabilisations, biomass export, micro-climate stabilisation, source of biodiversity and habitat for wildlife (Abira 1997, 47; Moss 1992, 141-142; Onyango, Massawa and Abira 1997, 59).

The rapid urban and industrial growth throughout the world, Kenya included, coupled with the ever increasing economic demand and human population growth have led to massive wetland loss. The ecosystems have been lost through drainage, reclamation, flood control or flow modifications, urban expansion and industrial developments (Briggs and Courtney 1989; 372; Emerton *et al.*, 1999; 1). In the Dakotas and Minnesota, USA, about 56,000 HA of wetlands is drained annually, in Finland, about 90% of the peat land, which covered 11 million Ha is drained and planted much for forestry, while in the Netherlands, drainage of peat lands has affected about 180,000 Ha of land, leaving only about 3,600 Ha undisturbed (Briggs and Courtney 1989; 377-378). In Japan, 35% of its mudflats have been reclaimed since 1945, while in Sumatra, as little as 7% of the estimated original peat swamp forest remained intact by the late 1980s (Anonymous 1997, 73). In the Ganges- Brahmaputra flood plain in Bangladesh, an estimated 2.1 million Ha (26.3%) of wetlands have been lost to flood control, drainage and irrigation (Khan *et al* 1994; 1). In Uganda, about 5% of the wetlands had been lost during the period between 1950/60 and 1993 due to human activity (Kasoma 2003, 9). In Nakivubo wetlands in Kampala, 2.39km<sup>2</sup>(45%) of the original 5.29km<sup>2</sup> had been modified or reclaimed by 1998 (Emerton *et al* 1999; 5). Kenya has not been spared since most of its wetlands have no known management strategies (NEAP 1994). There is therefore need for change of perception about the wetlands for sustainable development in Kenya lest they are completely lost.

The general objective of the study on which this paper is based was to investigate the utilisation of Nyamasaria wetlands in Kisumu town with regard to the urban growth in Nyamasaria area. Specific objectives included:

- To determine socio-economic activities in Nyamasaria wetlands.
- To investigate the vulnerability of Nyamasaria wetlands in relation to other wetlands in Kisumu town.

## Methodology

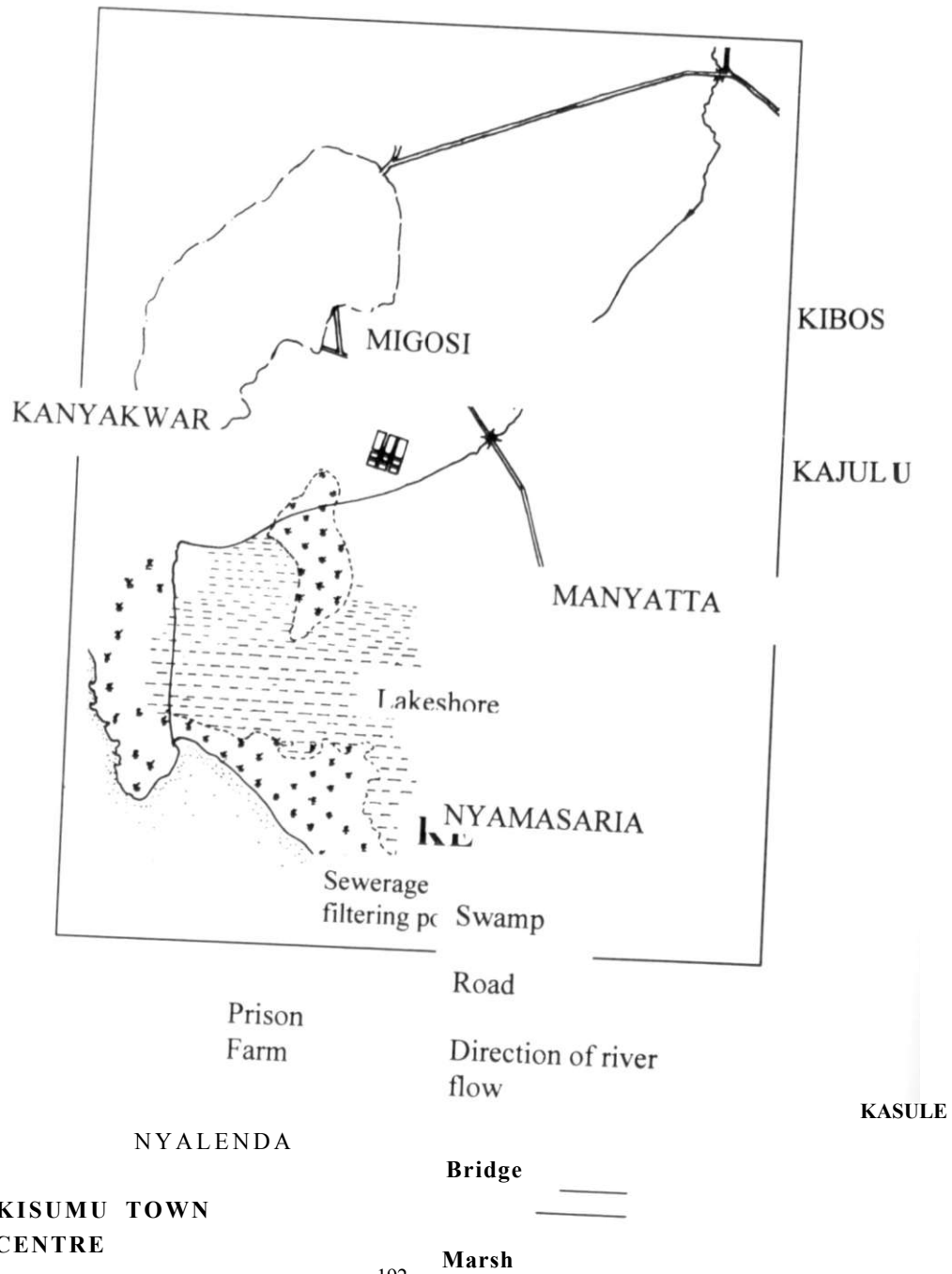
The word "*Nyamasaria*" is an indigenous Luo name. It originated from a small stream in the northeastern part now called Nyamasaria River. The stream was known as Nyatibo, and had its catchment from Kunya area. In the upper zone, the stream was called Nyatibo while downstream (Kasule area) it was known as Nyamasaria. The stream had no definite channel through to Lake Victoria and it remained so upto 1950s.

The area now referred to as Nyamasaria River in the downstream, was a good site for clay used for making ceramics, and pottery was a promising economic activity by 1950s. It was then called *Bur Lowo* (an area where clay is readily available). During the early 1960s, the area was seriously flooded following the heavy Uhuru (Independence) rains. The original stream channel disappeared and instead formed three distributaries draining into Lake Victoria. These are *Odeso, Luanda and Nyamria*. All the floodwaters were re-directed into one channel along the *Bur Lowo* by the then colonial government. The channel was re-named Nyamasaria River and it has remained so to date.

Nyamasaria wetland is the most extensive of all the wetlands in Kisumu urban area. It runs all the way from Kibos Bridge on the Kisumu-Kakamega road and enters the Lake Victoria at Nyalenda Swamp (Fig. 1). It can be divided into two catchments. The upper zone begins from the Kibos Bridge and ends at Nyamasaria market. The lower zone starts from the market and runs through to Lake Victoria covering the vast former Kasule village. It has a total length of about 12km.

The upper catchment of Nyamasaria wetlands has not been encroached on much in terms of urban expansion and/or settlements save for small-scale cultivation along the fringes of the Nyamasaria River and sand harvesting by the local communities. Extensive modification or reclamation occurs in the lower zone, with residential developments and small-scale enterprises taking the lead. Two management regimes exist in the wetlands namely, gazetted and private ownership. The wetlands are legally trust lands controlled by the municipal council. The local communities on the other hand privately own the land on the surrounding areas. The study focused on the urban wetlands in Kisumu town in general and Nyamasaria in particular. This is because it is most extensive and vulnerable of all the wetlands in the town. Other wetlands in the town include Dunga, Nyamthoe, Nyalenda, Mambo Leo, small pockets of wetlands near Muslim Cemeteries and Kicomi area.





The sample areas for the study included:

- Kajulu area in the upper zone.
- Kasule area on the lower zone.
- Nyamasaria urban centre.

## **Methods of Data Collection**

The study used the following methods to collect data:

- Literature Review: Related literature in wetlands from various textbooks, academic reports, government/project reports and the internet were reviewed to obtain information on wetland values, degradation and loss.
- Structured Interviews: Respondents (residents of Kasule, Kajulu and Nyamasaria urban centre) were interviewed to obtain information on socio-economic values of wetlands.
- Unstructured Interviews: Key informants were interviewed to obtain data on land tenure or management regimes of the Nyamasaria wetlands and the origin of the name "Nyamasaria".
- Focus Group Discussions (FGDs): FGDs were conducted to obtain information on the vulnerability of the Nyamasaria wetlands as compared to other wetlands in Kisumu town and the trend of utilization of the wetland resources.
- Participant Observations: Direct observations and participation helped in the full understanding of the activities carried out in the wetlands. Direct observations of the activities were particularly useful in crosschecking or validation of the respondents' answers.

The study used qualitative technique in the analysis of the data collected since the technique gives results, which are strong in terms of validity.

## **Results and Discussion**

### ***Utilisation of the Nyamasaria Wetlands***

The vast Nyamasaria wetlands resources, which include land, soils, water, plants and animals, have been utilised by the adjacent residents to generate subsistence, income, employment, and waste disposal mechanism.

### ***Human Settlement***

For along time. Nyamasaria wetlands have been occupied by the low-cost, high density settlements and slums. These mainly support urban dwellers with low income as well as those who carry out small-scale enterprises within the Nyamasaria market and its environs. However, with the expansion of Kisumu Town, the wetlands especially the lower zone, have been converted into medium to

high-cost residential settlements of medium to low density. The conversion is done by individual developers who consider the wetlands as wastelands that need to be put into more "useful" or "productive" developments or investments. The activity is an on-going process even at present.

### ***Waste Disposal***

Domestic wastes and urban effluents from the residential areas and Nyamasaria market respectively find their way to the wetlands. The waste and effluent get to the wetlands as run-offs (surface waters) or ground water inflows from the infiltration of rainfall from pit latrines and leaking waste pipes. The waste materials transported as raw sewage to the Lake Victoria via Nyamasaria River. The waste has both organic and inorganic components. The wetlands have also been used as waste dumping zone under the umbrella of land filling. Waste from the entire Kisumu Municipality is dumped in the area.

### ***Sand Harvesting***

This is an important income-generating activity for the low income residents as well as from the adjacent local communities within and around Nyamasaria area. It is quite predominant during rainy seasons when deposition of loads transported down stream is high. Sand is harvested and sold to individual developers in Nyamasaria as well as in other parts of Kisumu urban area as the demand may be. The activity, however, slows down when rains subside. But it never ceases at any point and time given the steady urban expansion of Kisumu town and its environs.

### ***Wetland Cultivation***

Nyamasaria wetlands support crop farming along the river fringes. This is because of the rich sediments deposited downstream, which enhance soil fertility. The river outflows during heavy rains also provide nutrients on the riverbanks, which support small-scale cultivation. Crops grown in the wetlands include maize, sorghum, bananas, cassava, beans, vegetables as well as sugar cane and rice. The most notable crop farming in the wetlands occurs near the Kameta fishponds and Prison Farm in the lower zone. The rest of farmers are from the low-cost settlements as well as the surrounding areas.

### ***Carwash***

Car washing is yet another economic activity that individuals from low-cost settlements earn a living. Water resource from the perennial Nyamasaria River sustains this activity.

### ***Tree and Flower Seedlings Propagation***

The wetlands provide water resources used in raising of tree and flower seedlings in the nursery beds along the Nairobi road in the sprawling Nyamasaria market. Sedge grass, which is locally referred to as *See*, is also harvested and used in the nursery beds. They are preferred in constructing shade for the seedlings, which have not been transplanted. The products find market in the restaurants in Kisumu town, medium to high-cost residential areas as well as elsewhere in the western Kenya region. The enterprise generates income for urban dwellers in the low-cost settlements.

### ***Fishing***

This is a small-scale activity carried out by the local communities in the surrounding areas. Fish caught are either sold or used for household consumption. It is most active during heavy rains when overflow river water carry with it fish to the flood plains. Fish are then caught when floodwater -recedes. There is a fish farming enterprise in the Nyamasaria wetlands - Kameta fishponds - just next to the Prison Farm, which is about 2km from the Nyamasaria Bridge. Fish species, which are mainly *Clarias* spp. find market in the local communities, Nyamasaria residential settlements as well as other markets such as Kibuye.

### ***Water Supply***

The entire populace of Nyamasaria area comprising both the adjacent local communities and the urban residents depends on the Nyamasaria River as their source of water for domestic, industrial (used in running posho mills), agricultural, and construction purposes. The local communities and the low income slum dwellers use the river water (untreated) for drinking, cooking and washing. However, the middle to high-cost residential settlements use treated and piped water from the river, which is sold at Sh.1 per pale or bucket. This, therefore, generates income to the machine operator.

Income is also generated when the river water (both treated and untreated) is ferried by bicycles (*boda boda*) or hand-drawn carts to households in the Nyamasaria settlements. The cost of transportation earns income to the individuals in this industry.

Besides the river, boreholes are also drilled in 'the residential areas by those who can afford to supply water for use. This is possible because of the high water-table in the area. Some of these activities such as waste disposal, wetland cultivation, human settlement and carwash may lead to reduced socio-economic benefits derived from the wetlands in the long run. Wetland cultivation and human settlement are likely to result in degradation and loss. Besides, the activities involve clearance of wetland vegetation (macrophytes), which provide materials

for building and construction. Waste disposal and carwash degrade the quality of water resource in the wetland. This may be detrimental especially if the latter is in large quantities that the wetland cannot cleanse through purification. This will impact negatively on the residents who use untreated water from the river.

Urbanization has further exacerbated wetland degradation and loss. The accompanying activities such as expansion in urban residential settlements, waste generation among others are potential draw backs to the socio-economic benefits from wetlands. Conversion of wetlands into urban residential settlements is a common occurrence in Nyamasaria area, and this is likely to impact negatively on the wetlands in the long run.

### **Vulnerability of Nyamasaria Wetlands**

Nyamasaria wetlands are the most vulnerable of all the wetlands in Kisumu town. Their vulnerability is explained in terms of the negative associations that the surrounding communities, especially Kasule clan, had on the wetlands. The ecosystems were considered a health hazard (unhealthy places) and therefore was not preferred for human settlement.

This explains why the right bank of the Nyamasaria River from the bridge to the lake was not habited by the local communities (Kasule people). The area was initially flood prone and swampy. The wetlands were thus considered a possible health risk (they were associated with water-borne diseases). Consequently, the land parcels were sold to individual developers, who have since then developed the area for human settlement.

The Nyamasaria wetlands acts as a sink tank for rich, fertile top-soil from the upper catchment. Material from the upper zones are transported downstream and deposited on the lower zones of the wetland area. These materials contain silt and organic soils, which are very fertile for agricultural production. The potential of the wetlands to support farming activities has encouraged their reclamation to give room for cultivation as is evident in the vast region down the lake (about 1km from Nyamasaria Bridge).

Degradation and loss of the wetlands is also attributed partly to the ignorance of the possible, environmental consequences when such ecosystems are degraded and/or lost, and partly to the greed for wealth, which is rationalised as "development". The consequences are therefore considered minor and hence ignored altogether. The complex scenario is viewed by Moss (1992;146) as complete alienation from the environment in the face of technology. "We have become separated from our natural environment and tend to see ourselves and our cities as self-contained islands in a sea of surroundings that has little consequence. Even worse, propaganda makes us believe that our apparent wealth comes from commerce and industry; the reality is that it comes ultimately from photosynthesis

and rocks. Our connectedness with the intrinsic understanding of the operation of the global biosphere has been undermined" (Moss 1992:146).

The location of the wetland in relation to other wetlands in the town also explains its encroachment. It is relatively near the Central Business District (CBD). The easy access to these points makes Nyamasaria a better site for residential settlements than other places such as Dunga. Dunga is perceived to be in the "outskirts" of the town and also not connected to any highway hence does not attract as many settlements as compared to Nyamasaria. This phenomenon has led to serious encroachment of the Nyamasaria wetlands than any other wetlands in the city.

### **Threats/Effects of Current use of Nyamasaria Wetlands**

The unsustainable utilisation of the wetland resources and services over the years has degraded the ecosystems, and risk being lost if not checked. The most serious threats to the wetlands are the rapid urban expansion and the proliferation of residential settlements by individual developers within the Nyamasaria area. The trend is likely to continue because of its (Nyamasaria) proximity to the city centre and relatively cheaper land prices than in other parts of the Kisumu Municipality such as Milimani, Tom Mboya and Migosi estates.

The continued development of residential settlements both within Nyamasaria and in other parts of Kisumu town calls for increased demand for sand. This means increased sand harvesting, which in turn is likely to result in vertical river erosion due to riverbed dredging. The overall impact would be low nutrients for the small-scale cultivation and river overflows would be minimal unless heavy rains occur. Indiscriminate macrophytes clearance downstream to give room for cultivation is also likely to result in floods and river bank erosion since the macrophytes have the potential to limit the ravages of floods and the capacity to protect landscape from adverse erosion caused by stream or river action. Besides, the macrophytes clearance will also impact negatively on the biodiversity in the wetlands.

The macrophytes provide important habitats for a wide range of wildlife, which include reptiles, amphibians, birds as well as small rodents, insects and microorganisms. Their clearance therefore will compel these animals to migrate to other favourable sites for habitation while some will succumb to death in the process hence leading to reduced biodiversity. Fish-catch is also likely to decline in the long run due to continued exploitation of the resource in the wetlands. Pollution is yet another threat to the wetlands and this affects the general hygiene and the environment of Nyamasaria area. Pollution results from the continuous dumping of both domestic and urban waste in the wetlands by the residents of the entire Nyamasaria area and the city garbage collectors. The most notable is water pollution, which is likely to result in the outbreak of water-borne diseases such as typhoid and amoebic dysentery. The most vulnerable group is the low income slum

dwellers of Nyamasaria as they cannot afford to buy treated water and depend on the untreated river water for their domestic use.

The paper has not indicated the extent or level of pollution, but the likelihood of pollution of the river water can be inferred given the wastewater disposal in the Nyamasaria River either directly or through surface run-offs. Research has found that wastewater disposal result in enormous pollution in river water. For example, studies on Sondu-Miriu River by LVEMP (2001) and Indian Rivers by Das and Kaul (1992; 5-7) have indicated pollution of river water

The current utilization of the Nyamasaria wetlands is expected to result to a general decline in the wetlands resource availability in future if no mitigating measures are taken. This will lead to reduced or total loss, of livelihoods to the local communities and low income to slum dwellers in the study area, who partially or wholly rely on the wetland resource. The private developers on the other hand, will benefit through the economic gains through rent revenues that accrue. The projected study outcome on the trend of the wetlands resource availability agrees with the findings of Lelo, Muhia and Yobterik (2001, 27) through a Participatory Rural Appraisal (PRA), which was conducted at the Nyadina community in Nyando District (Table 1).

Table 1: Historical Resource Matrix at Nyadina Community

Resource	1960s	1970s	1980s	1990s	2000	Future
Fish						
Livestock						
Papyrus						
Fuel wood						
Sand						

SOURCE: Adapted from Lelo, Muhia and Yobterik (2001; 27)

Note: Indicates quantity of resource available

## Conclusion

The socio-economic benefits of Nyamasaria wetlands have the potential of directly sustaining the livelihoods of the adjacent slum dwellers. However, urban expansion and its associated increased demand for housing is likely to lead to loss of the wetland resources and services as well as their associated economic gains. There is no dispute about the potential economic benefits, which are likely to arise from these developments. However, they should be undertaken after the economic costs associated with the loss of wetland resources and services have been considered. This involves quantification of the economic benefits of the wetland goods and services. Such consideration is, however, not done in most cases. There is, therefore, need for change when setting up any development agenda in Kenya.

## Recommendations

It is imperative to note that wetlands are never wastelands and their modification and conversion can lead to deprivation of livelihoods at least for some people. For sound development agenda especially regarding wetlands in Kenya, the following should be taken into consideration:

- Urban planners, decision makers and developers should understand the economic value of wetlands with a view to comparing it with the proposed development or investment.
- There is need for a clear government policy on wetlands utilization in Kenya. What so far exist are the rules on the protection of Kenya's wetlands as contained in section 24 (1-5) of Environmental Management and Co-ordination Act, 1999 (No. 8 of the 1999 Act) (GOK 1999). Clear-cut policies, regulations and Action Plans on the sustainable utilization of wetlands are therefore lacking. Such policies if put in place will safeguard against the loss of wetlands in Kenya, Nyamasaria included.
- Building codes and local government by-laws should always be adhered to whenever any development is to be undertaken within the municipal.
- Local resource users' views must always be incorporated in the event of any development since they are the direct beneficiaries or losers as the case may be.
- There is need for community awareness, especially the wetland resource users, on the values and functions of wetlands and also on the environmental consequences of their loss and/or degradation due to unsustainable utilization.
- A clear legislation on wetlands tenure systems is very crucial in Kenya if sustainable utilization of wetland ecosystems is to be realized.
- Kenya's Universities and other tertiary institutions should offer courses on wetlands conservation and management since there are no courses currently taught in these institutions that are specifically tailored towards wetlands conservation and management.
- Wetlands should never be used as dumping sites as this may result in serious loss of biodiversity in the long run.

### Notes 1

1. Wealth: Refers to the socio-economic gains or benefits derived from the wetland resources by different users.

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## REFLECTION ON THE LAND TENURE SYSTEM IN KENYA

*Grephas Opata*

### **Abstract**

Land and land based-resources are critical to Kenya's development and the fight against poverty. The management of this resource however, raises serious challenges. Indeed the land question in Kenya is alive and vexatious. It is manifested in pressure on land, encroachment on semi-arid and arid lands, gross disparities in land ownership, inter-ethnic conflicts over land, land grabbing by the political elite et cetera. The effects of these have hindered the country's efforts towards poverty reduction. Proper land reform to address the land question is urgently needed. As a basis for land reform it is essential to understand the root causes of the land problem. This paper examines the genesis of the land problems in Kenya and makes suggestions towards a holistic and systematic policy reform.

### **Introduction**

From traditional economic thought, land is one of the basic factors of production. In transitional societies such as Kenya, Land is one of the most valuable productive resources. This is acknowledged in the country's Poverty Reduction Strategy paper and Economic Recovery for Wealth and Employment Creation (ROK 2003). It is a key factor in the development process of the country especially given the fact that currently agriculture is considered the backbone of the economy (Opata 1999). Over 82% of the Kenyan population reside in the rural areas and derive their livelihood directly from agriculture and agricultural related industries. Thus, land for the majority of people is a central resource that they need to manage well in order to be able to meet their basic subsistence needs and cash incomes.

Kenya has a land surface area of approximately 582,646 sq. km. (ROK 1989). Of this, 97.8% is land and 2.2% is water. Forests, woodland and national reserves and game parks account for about 10% (58,264 sq. km) of the land area. Of the total land area only about 20% constitute the medium and high potential areas which support about two-thirds of the country's current 30.4 million people. The rest is mainly arid and semi-arid. Despite the centrality of land and land-based resources to the country's development, the management of these resources has posed serious challenges to

the country's leadership. The situation on the ground points to serious problems of the administration and management of land. Past initiatives by the government such as the select committee on the issue of land ownership along the ten-mile coastal strip (KOR1978), the Judicial Commission to inquire into tribal clashes in Kenya (ROK 1999), the Judicial Commission of Inquiry into the Land Law System in Kenya (ROK 2002) and presidential commission of inquiry into the illegal/irregular allocation of public land (ROK 2004) does not seem to have come up with concrete steps to address the land question in the country.)

There is need for concrete land reform measures to redress the prevailing problems pertaining to administration, ownership and management in the country. For this a clear understanding of the Land problem is essential. To clearly understand the genesis of the land problem, it is considered essential to examine the evolution of the tenure system in Kenya.

## **Land Tenure System**

In simply terms, land tenure refers to the terms and conditions under which rights to land and land based resources are acquired, used, disposed of, or transmitted. It signifies the set of relationships among people concerning the use of land. Tenure system serves as expressions of values to which society assigns to land. They vary from those who regard land as a trust, to be utilized and protected for use by the future generations to those who regard it as a commodity to be enjoyed and exploited like any other commodity.

A review of the land tenure system in Kenya shows that it has evolved over three main periods: pre-colonial, colonial and the post-colonial period. We will briefly examine the tenure system and practice in each of these periods.

### **Pre-colonial Period**

Land tenure and use systems in pre-colonial Kenya were not uniform. They varied from one community to another and were dictated by such factors as nature of subsistence, climatic conditions, cultural values, socio-political and economic organization (Kanyinga 2000, Musyoka 2004).

During this period the dominant land tenure system has been described as communal or customary (Okoth Ogendero 1967). A characteristic feature of communal or customary tenure is that land is regarded as belonging, not to the individual, but to the whole social group (Payne 1996). Customary land is not subject to personal ownership, although use rights are alienable within and between members of the community. Essentially land was owned by clans, ethnic groups or communities collectively, and was available for use by any member of the community. Once land was under use by an individual or family, it was recognised as belonging to that individual as long as he continued to use and reside on it.

Access to land was based on membership in a land controlling social entity defined by birth, marriage, ritual, adoption or incorporation and it tended to be specific to a function, for example cultivation, grazing or hunting. Individuals or groups could hold a right or bundle of rights expressing a specific range of functions. Each of these functions carried with it varying degrees of control exercised at different levels of social organisation. These rights were guaranteed and the boundaries which each family lineage, clan or ethnic group fixed and marked to show the extent of its land and were supposed to be recognised and respected. But this did not always happen and encroachment onto a clan's territory by another was not uncommon (Musyoka 2004). This at times resulted into inter-clan skirmishes over land.

With respect to the way the rights of land use were distributed within the household the following observations can be made:

- Though the household head was thought of as the owner, men did not have absolute rights over land. They had only user rights and the rights were limited by the rights of use held by other members of his household.
- Women normally acquired user rights over land by virtue of marriage. Among many communities the wife or wives each held fields assigned for their use, an assignment which once made was often irrevocable and which was one of the rights a wife expected within wedlock.
- Redeemability: This concept implied that land could be temporarily mortgaged or leased but could not be permanently transferred from one clan or community to another. Hence it was only the transfer of the user rights and not the land. If a piece of land was mortgaged, the mortgagee received the right to use the land for a definite period, but the land could never be alienated for it was always subject to redemption by the vendor.

Within this context of land ownership in the traditional setup, we can make the following observations:

- Land was considered a social resource. This is the best capture by a Ghanaian Chief who observed *'.../ conceive that land belongs to a vast family of whom many are dead, few are living and countless host-, are still unborn'* (Ollenu 1961).
- Subsistence opportunity was assured for all.
- There was no individual ownership of land.
- The concept of "No land" was unknown.
- There was no sale of land.
- There was no discrimination against women in as far as access to land was concerned.

## **The Colonial Period**

Kenya was declared a British protectorate in 1895 and became a colony in 1920. In their quest to exploit the colony, the colonial power put in place regulations and rules that drastically changed the system of land tenure in Kenya. These regulations included: the Crown Lands Ordinance of 1902 and 1915, the Native Lands Trust Ordinance 1938 and the Swynnerton plan.

Guided by these regulations and statutes, and in order to ensure security both in the legal and jurisdictional sense, the settlers demanded that all land considered or likely to be suitable for European settlement should be set aside for their exclusive use, actual or prospective. They therefore recommended that Africans be grouped into definite reserves far removed from European centre or any lands likely to be opened up for European settlement. Towards this end, two important things happened:

- Firstly, Kenya was divided into the White Highlands and the Native Reserves. In the former, only Europeans were allowed to hold land. Africans were enclosed in the native reserves, where the majority of the rural population was crowded. The colonial administration located native reserves in areas deemed unsuitable for European settlements, drew their boundaries along ethnic lines and ensured by law that natives were not allowed to reside in any reserve other than the one allocated to their ethnic group.
- Secondly, all land in the colony became known as Crown Land. A crown land was defined as "all public land within the colony which for the time being is subject to the control of his majesty by virtue of any treaty, convention or agreement or by virtue of his majesty's protectorate and all lands which have been or may hereafter be acquired by his majesty" (Okoth Ogendo 1976).

In essence, the colonial rulers took over all the land in the colony and turned Africans into tenants and/ or squatters. The effect of the above changes created insurmountable problems among the Africans and led to political agitation. In an effort to protect the settler community and contain the growing agitation among Africans, the colonial administration came up with a reform plan called the Swynnerton plan named after the then colonial director of Agriculture. In the plan, the colonial government argued that the issue of accessibility of land was basically one of tenure and technology of production.

The former was to be dealt with by restructuring the system of property rights in the reserves in such manner as to confirm "security of tenure and the latter through intensification of agricultural production in more areas" (Ibid 1976). The Swynnerton plan basically had two main elements. One was the individualisation of land tenure through the process of registration and consolidation of small African holding. Individualisation of tenure was essentially meant to legalise the

lands that the settlers had taken forcefully from Africans. It was extended into the African reserves with a view to confining them in these reserves. One could only claim ownership to a piece of land if one had a land title deed for it.

The colonial office issued these titles. The East Africa Royal Commission 1925 report extolled the merits of individual tenure thus: "...Individual tenure has great advantage in giving to the individual a sense of security in possession and in enabling by purchase and sale of land, an adjustment to be made by the community. The ability of individual to buy and sell land by a process of customs, opens the door to that mobility and private initiative on which a great sector of economic process tends to depend" (Ibid 1976).

Individualization of tenure was bound to create landlessness: This was not by accident. Swynnerton had envisaged landlessness occurring as a consequence of his plan. To him this was positive. He argued that, "...Once registered farmers will be able to buy and sell land, amongst other Africans only and to mortgage title to land against loans from government or other approved agency. This would lead to a situation where able, energetic and rich Africans will be able to acquire more land and bad, poor farmers less, creating a landed and a landless class. This is a normal step in the evolution of a country (Swynnerton 1954).

The other element of the plan was to legalise the concentration of research, extension and other resources useful to agricultural development initially to European settler's and subsequently to a select group of prospective African farmers. These were to form a buffer zone between the white settlers and the peasantry. From the foregoing, we observe that the colonial regime completely changed the previous land tenure system in Kenya. The regime introduced an alien concept of property ownership with respect to land. The administrative and legal instruments introduced by the regime had the effect of creating several classes of land owners, the main ones being the colonial state and the settler community who owned large holdings in high potential areas, the African peasantry who were crowded in the degraded African reserves, a pocket of few prosperous African farmers who acted as a buffer zone between the settler community and the crowded African reserves and the landless and squatters on Government farms.

The net effect of this system was to perpetuate a dual system of economic relationships consisting of an export enclave controlled by the settler community and a subsistence periphery operated by the Kenyans. In essence the system and practice introduced people-land relationships that favored the colonial settlers at the expense of the Africans. It created disparities in land ownership, discrimination in farm development and landed, and landless classes.

Looked at in retrospect, we can observe that the current mismanagement of land as a resource at the national level and the subsequent attendant problems have their origin in the colonial land tenure system whose main objective was not

development of the colony, but to entrench a dominant settler economy while subjugating the African economy.

### **Post-Colonial Period**

Given the discriminatory Land Laws put in place by the colonial authorities and considering the fact that land was a key reason for the struggle for independence, it was the expectation of Kenyans that the attainment of political independence would be followed by a major reform of the land tenure system. This was not to be. The land laws that were put in place had their basis and inspiration from the colonial land policies.

The main legislation put in place by the independent government included: Registration of Titles Act, cap 281, Government Lands Act cap **280**, Land titles Act cap 282 Registered Lands Act cap 300.

Since the attainment of political independence the government has continued with the process of registration and titlement that begun under the Swynnerton plan. Each district has a land office that carries out the process of surveying, registration and titlement of land. In the current Constitution of Kenya, there are three main types of landownership which derive directly from The Swynnerton plan. These are the trust land, state or government land and land under freehold titles

(a) **Trust Land:** Section 202, subsection 5 of the Constitution states that, each county council shall hold the trust land vested in it by this section for the benefit of persons ordinarily resident on that land and shall give effect to such rights, interests or other benefits in respect of the land as may, under the African customary law for the time being in force and applicable thereto, be vested in any ethnic group, family or individual.

These were lands that belonged to particular ethnic communities. These lands have since independence been held by County Councils and Local Authorities under the Ministry of Local Government on behalf of the communities concerned. Such lands have generally not been available for farming unless degazetted by the Minister for Local Government for **the** time being.

(b) **Government Land:** According to the Constitution of Kenya, section **205**, all land formerly vested in the British Crown (Crown Lands) were vested on **the** President of Kenya on behalf of the Government and people of Kenya.

Such lands include:

- Former white settlement areas where the government alienated land from indigenous ethnic communities and made leases for 99 years to white settlers.
- Unoccupied, underutilized regions mainly left to natural flora **and** fauna and subsequently earmarked for special purposes **as**

'shooting blocks', water catchment's areas, excavations mining et cetera.

- Forest land, reclamation areas and land appropriated for specific development programmes such as state farms, settlement schemes and town development.
- Land alienated for game: The current game parks are: Tsavo, Amboseli, Mara, Mt. Kenya, Samburu, Meru, Aberdares, Marsabit and Nairobi.

**(c) Freehold Tenure:** Freehold tenure is the most common form of land ownership in Kenya. It is in areas where land adjudication and registration has been completed. The land owners have their title deeds either in their possession, in the district land office or deposited in the banks as security for loans.

### **Implications of the Current Land Tenure Systems**

This system of land tenure has had serious implications. We can note the following:

- Firstly the issue of public and trust land as outlined in the government Lands Act assumes a transparent, efficient, accountable and corruption-free administrative system which will hold the land in the public interest. In the absence of this, what has happened is that the well placed in society (Senior Civil Servants, politician, top military brass, businessmen) have been the beneficiaries of state land. Over time, since independence, the government has through the Minister for Local Government degazetted, sub-divided, titled and dished out large chunks of land under this category to bureaucrats, politicians and politically correct individuals. Most of these people are not farmers. On receiving the land grants from the government, they have either sold it to foreigners, kept it for speculative purpose or just left it lying fallow. The communities' reaction to this has led to ethnic land clashes that have been persistent in Kenya to this day. This has led to further alienation of the rural poor and enhanced the problem of landlessness leading to squatting, food shortage and famines.
- The second problem, which is related to the first, is the unequal distribution of land. To just cite an example, in the year 2000, one prominent politician donated 4,000 acres his family land in Taita Taveta district to squatters. He promised to donate a further 4,000 acres. The family's Gicheha farm in the district comprised 34,000 acres. According to conservative estimates the family has at least 400,000 acres of land in the Central, Rift Valley and Coast provinces.

Put together, this is approximately about the size of Western province whose current population is over 3 millions persons. In a country where land is so valued and scarce there is something inherently hideous, obnoxious and undemocratic



about this kind of ownership. The question here is; how did this family come by 34,000 acres of land in Taita Taveta district when landlessness is such a widespread and pressing issue?

Furthermore, individualisation of land tenure derived from the Swynnerton plan has not led to full use of land. Currently, large chunks of land are owned for asset value and speculative reasons rather than for productive purposes. Further, land registration created a legal basis for a market in agricultural land. This has led to a situation whereby the well-to-do farmers involved in cash crop production have tended to buy out peasant farmers involved mainly in food production.

Thus land titlement and the resultant commercialisation has led to a lopsided effect on crop production, with greater emphasis being put on cash crop production at the expense of food crop production. An immediate consequence of this has been severe food shortages and famines. Kenya has experienced severe famines in 1974, 1984, 1994, 1996, 1997. During these famines, the hardest hit segments of the population have been the rural dwellers. Another problem is the issue of landlessness. Land registration and titlement under the Swynnerton plan created large disparities in ownership of land and a class of landless individuals by displacement of relatives, friends and tenants. The problem of inequality in land distribution still remains. Since independence, large portions of land have been purchased by a variety of institutions and individuals with access to capital. For instance, by 1977, 34% of large farms were owned by a group of wealthy individuals, 29% by partnerships, 25% by companies and 12% by cooperatives (ROK 1997). People with little or no capital either have very small pieces of land or are landless.

Directly related to the problem of landlessness is the squatter problem. Squatting resulted from the 1915-25 labour laws that encouraged Africans, already displaced or experiencing acute population pressure due to European settlement, to settle on European occupied land as labour tenants. Currently squatting is common on government land. These squatters are not protected by any law. They can be evicted at will by the land owners.

Land has been converted from a resource to a commodity that can be sold, leased, charged or mortgaged at the absolute discretion of the proprietor; creating a land market. Currently access to land is increasing market driven. The notion that Registration and titlement will improve marketability of the land and permit more productive uses of the resource is based on the invisible hand principle of the market forces which has not worked in other sectors.

The other implications include:-

- Severe pressure on land. In the rural areas, the high to medium potential zones are dominated by small farm holdings. Most of these are suffering continuous fragmentation into uneconomic sizes. In addition many large

farms that used to produce seed and breeding stock have been subdivided and transferred from state to private ownership.

- Deterioration of land quality as a result of poor land use practices.
- Unproductive and speculative hoarding of land by the political elite.
- Wanton destruction of forests, catchment areas and areas of unique biodiversity.
- Severe competition between wildlife needs and those of human settlement.
- Inter-ethnic conflicts over land.

Hence, the type of land tenure in place since independence has, over time, worsened landlessness, unemployment and poverty in rural Kenya. What seems to have changed with the attainment of political independence is the racial composition of the group of people in the centre of power, but with not much effect on the mechanisms which maintained the former unjust, unequal and oppressive colonial regime.

## **Conclusion**

The current system of land tenure, which has its roots in the colonial system, has not served the interest of Kenyans with respect to access and use of land as a resource. Instead the system has resulted into the land problem which manifests itself in many ways such as disparities in land ownership, deterioration in land quality, underutilization, landlessness and squatter settlements amongst others. To arrest this situation there is need review the existing Laws and come up with land reform measures that will make it possible for as many Kenyans as possible to own, access and sustainably make use of the land resource.

## **Recommendation**

The situation on the ground points to the serious problem of the administration and management of land as a resource. There is need for concrete land reform measures to redress the prevailing problems pertaining to land administration, ownership and management.

Towards this end, we make the following recommendations.

- To introduce a land redistribution policy in which a ceiling be put on the maximum size of land an individual can own. We propose that no one Kenyan should be allowed to own more than 10,000 acres of land.
- As a measure to discourage people from holding land for speculative purposes, a land tax should be introduced. This should be levied on any agricultural land which is more than five acres.
- All Kenyans, whether male or female, should have equal opportunity of access to land whether through the market system or inheritance.
- As a measure towards redressing historical inequities and injustices in the distribution of land, all public land acquired illegally or through corrupt

practices should be repossessed. Such lands include Government forests, public recreational areas, public utility land, water catchments areas amongst others.

- Establishment of efficient local based land boards to deal with land disputes rather than relying on the courts.

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