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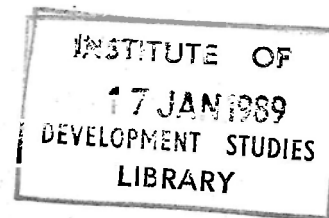
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SECONDARY SCHOOL EDUCATION FOR GIRLS IN KENYA: THE
NEED FOR A MORE SCIENCE-BASED CURRICULUM TO ENHANCE
WOMEN'S GREATER PARTICIPATION IN DEVELOPMENT.

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"Secondary School Education for Girls in Kenya:
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Enhance Women's Greater Participation in Development"

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ABSTRACT

The paper outlines the important role women have and continue to play in agriculture, health, co-operatives and informal sector activities. It then looks at the educational opportunities available to them and particularly in the field of science and technology. Data is provided which indicates shortcomings in this field. The paper then argues for concerted efforts to improve the access of girls to quality science education especially at the secondary school level and thereby uplift the scientific literacy and skills of women.

While the paper argues for continued attention to factors which initially hinder access of girls to formal education, it recommends increased focus on what goes on within the education system. The quality, diversity and effectiveness of curriculum offered at all levels of the schooling system should therefore be a matter of critical concern. Stress should be given to quality science curriculum not only to improve the competitiveness of women in formal sector opportunities but much more so to enhance their mastery of scientific and technological knowledge and skills necessary for participation in various spheres of development.

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I. INTRODUCTION

Towards the end of 1988, Kenya will be celebrating its twenty-fifth year of political independence. During this period, the country has undergone many changes which have profoundly affected the character of its economy, population, social structure, education and the situation of women. This paper is an attempt to analyse the changes which have occurred in education, focussing in particular on the curriculum offered to girls at secondary school level. Our analysis starts with the socio-economic context of the development of education and then moves into a brief outline of the changes in the educational sector. This leads us to a discussion on educational opportunities for girls at the secondary school level which is followed by an analysis of the curriculum offered thereof. We then attempt to draw the implication of that curriculum to the educational opportunities, careers, and overall participation of women in development in Kenya.

II. THE CONTEXT OF DEVELOPMENT OF EDUCATION IN KENYA

(a) The Colonial Legacy:

The present Kenya has evolved from a colonial economy, dominated by a powerful minority settler community who controlled practically every aspect of colonial development with support of the British Government, to a mixed economy whose agriculture is predominantly in the hands of African small-holder producers (ILO:1972) while industrial and commercial sectors are still dominated by Asian and foreign capital. The colonial framework provided the missionaries with opportunities to propagate Christianity and initiate western education for the Africans. At the same time, some of the Asians who were brought into the colony at the turn of the century to provide labour for building the Kenya-Uganda railway, remained, to be followed later on by more migrants from the Indian sub-continent. They provided skilled and semi-skilled labour to the country. The Asians also moved into retail trade, wholesale business and other commercial services, a sector they have dominated since then (Swainson:1980). The Africans on the other hand, being deprived of some of their agricultural land and being limited in access to

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* I am grateful to Wanjiku Kabira, Ben Makau, P. Njeri Mwaura and Pauline Riek for comments on the earlier draft of this paper.

western education and improved agricultural methods, became unskilled labourers on the European farms and other colonial enterprises. It is necessary to note here that the opportunities which existed for Africans for western education and employment in colonial Kenya were predominantly taken up by males (Kinyanjui:1975, Kagia:1985, and Obura:1986). The consequences of these policies have remained even after independence.

The colonial division of labour was accompanied by racial inequality in allocation of political power, economic and education resources. This form of inequality was the most dominant in the colony and tended therefore to make other forms of inequalities such as regional, class and gender. Consequently the conflicts which dominated the life of the colony were those between the colonised majority on one hand and the colonial settlers and administrators on the other. These were the concerns and conflicts which shaped the character and pace of development in the colonial period (Rosenberg and Nottingham:1966).

The conflicts of the colonial society exploded into the Mau Mau insurrection of 1950-1957 which in turn forced the colonial power to initiate reforms which were intended to diffuse the conflicts in the colonial society by incorporating the Africans into the mainstream of the economic and political system.

The reforms which were started by the colonial administration were carried out through by the independent government and involved political institutions (Colonial Legislative Council becoming the National Assembly, the establishment of political parties, adult franchise etc), the labour market (establishment of labour unions, and provision of amenities for workers with a view of establishing what was predominantly a migrant labour), involvement of Africans in urban commercial enterprises; and most important of all land reform and agrarian change (Leys:1974; Kinyanjui:1979; and Chege:1987).

The reforms started in 1954 and continued for the first fifteen years of independence. The outcome of this process has been emergence of a political, economic and social system which is predominantly controlled by an African elite in alliance with international capital. The reforms ensured smooth transition and continuity of the capitalist development which was founded in the colonial period. These policies also ensured the entrenchment

of the system which on one hand stifled and marginalised the forces which challenged this form of development, and on the other created a favourable climate for international capital.

As a means of highlighting the position of women in the Kenyan society and thereby providing a context in which to analyse secondary school curriculum and opportunities for girls, we intend to focus briefly on two aspects of post-colonial development, agriculture and education.

(b) The Agrarian Change

The land reform which was carried out from 1954 and well into first and second decades of independence, involved change in land tenure in the former African areas or reserves as they were then called, and the establishment of settlements for the landless, and allowing individual ownership of land by rich Africans in the former white highlands. In African areas, land reform consisted of land consolidation, registration and the issue of title deeds to individuals. This process which started in central districts of Kenya in the fifties was extended into other areas in the sixties and seventies. By 1977 over 11 million hectares of land had been consolidated which meant most of the land in Central, Western and Nyanza Provinces and most of the districts in the Rift Valley had undergone this change. In the last ten years virtually all the remaining districts in Rift Valley, Eastern and Coast Provinces have been affected by the land reform. Individual ownership of land is now an established form of land tenure in the high potential agricultural areas which make about 20 per cent of Kenya's land. Most of this land is however, registered in the names of men.

These land measures have been closely followed by promotion of commodity production by small-scale producers. Production of coffee, tea, pyrethrum, sugar-cane, dairy cattle and horticulture was introduced in areas where land reform had occurred with the support of credit facilities being provided by government agencies and technical services like agricultural extension being provided by the staff of the Ministry of Agriculture.

The second aspect of land reform was the extension of land frontier through the acquisition by the government of the land which was owned by British settlers for the settlement of landless Africans. About a million acres were utilised for this purpose, leading to the creation of new rural

districts. This process was possible through international capital from Britain, West Germany and the World Bank. These new settlements received technical and financial support to enable the small-holders to enter into cash economy (ILO:1972). In addition, many groups in central Kenya organised themselves into land buying cooperatives, which acquired more land for their members. While in the sixties and seventies, these land-buying cooperatives continued to farm and manage these farms collectively, the government in 1981 decided to break-up all land-buying cooperatives and companies because of corruption and mismanagement which existed in their operation. This has led to further fragmentation of the former large-scale farms. The remaining large scale farms were acquired by individuals or remained in the hands of international corporations. These have maintained their declined but significant proportion of total production of tea, coffee and horticulture.

These changes in the countryside have affected the character and relations of production distribution and social differentiation in rural Kenya. The production of commodities for export and domestic market is predominantly in the hands of the small-producers. In 1985 small-scale producers accounted for 54 per cent of the gross marketed production as compared to about 40 per cent in 1965. This dominance of the small-producers should also be noted in the production of food for domestic consumption, whose value is not computed. It should however be noted that beyond the objective of increased agricultural production, there are other critical issues like how this production is controlled and shared, and its consequences to social differentiation in the countryside. While these issues are pertinent to an analysis of agrarian change in Kenya since independence, this paper because of its focus does not directly or in detailed form deal with these problems.

The second aspect of these developments have been the emergence of agricultural cooperatives as major forces in economic and agricultural development. These co-operatives have invested their surplus capital in both rural and urban areas, in addition to providing farmers with farm inputs, transport and above all marketing of agricultural commodities produced by peasant farmers. In 1980 these societies numbered about 1,370, and increased to 1,557 in 1985 (Mutiso: 1987).

The realisation of agricultural and land policies in Kenya in the last thirty years would not have been possible without the contribution of rural women, both agricultural and pastoral. Recent research (Wanjiku Kabira,

et.al 1985; ILO JASPA: 1986. Gachukia, et al: 1986, Safilios-Rothchild and Mburugu E. 1986 and others) in Kenya has indicated the enormous contribution women have made in the implementation of agricultural policies such as the introduction of cash crops (coffee, tea, pyrethrum), dairy cattle, improved seeds (maize and horticultural crops) and in the success of agricultural co-operatives. Until towards the end of the seventies, this contribution has occurred in the context of women having no legal rights to ownership of the land, but rather the user rights. Women access to land has been made possible in most cases, through absence of males from homes, by an increase in the number of households which are headed by females, and in addition to women buying land through women's groups.

Although women are the main producers of cash food crops, their membership of the co-operatives have been limited to a small proportion of the total membership, which seem to indicate they do not have control over the incomes from their farm production. In 1975, women formed only 16 per cent of the total membership of the co-operatives in Kenya which was 887,000. However, this situation is rapidly changing, for in 1984 the proportion of women had increased to 30.2 per cent out of 1.8 million. While membership of cooperatives is slowly coming to reflect the true picture of agricultural producers, the credit facilities (Shipton: 1985: 315) and extension services have however retained their structured bias against women. The extension workers have in essence been educating the husbands along the farmers, and not directly educating the farmers (women) themselves.¹

Recognition of the role of women in agriculture is crucial in planning of the provision of services, technology and education required to reinforce and enable agricultural producers not only to intensify their production but also to take products of their labour. Formal and informal education is therefore not only important in enhancing production and adoption of rural innovations, but it is also a crucial tool for empowerment of women in all sectors of the society. In this respect science education for women is very important for continued increase in food production and family welfare.

1. Onyuke, Audrey, "African Women Feed the Continent" African Concord August 6, 1987, p 29-30. The writer argues that "agricultural machinery, improved seeds, fertilizers inputs and credit should be directed to women" see also CASTAFRICA II, 'Kilimanjaro Declaration' adopted by the second Conference of Ministers Responsible for the Application of Science and Technology in Africa: Arusha, Tanzania July 15, 1987.

(c) The Population Growth

The main developments in the country during the last two decades have focused on how to improve and maintain the standards of living of the population through measures such as land reform, introduction of agricultural innovations, credit and technical services, and increased health services. In general, this has to be done through investing in rural infrastructure and services which are all geared towards increasing rural incomes, and access to education and employment opportunities. It is however, necessary to note that all these changes have occurred in the context of a rapidly increasing population. Kenya, at the time of independence has a population of about 8.6 million which increased to 10.9 million in 1969 and 16.1 million in 1979. Currently, Kenya population is estimated at 21 million. The annual growth rate of the population in the period between 1962 to 1968 was estimated at 3.4 per cent and increased to 3.8 per cent between 1969 to 1979. This trend has continued in the eighties at an estimated growth rate of 4.0 per cent, the highest growth rate in Africa. This rate of population increase is expected to continue well into the next century, (to an estimated population of 36.5 million in year 2000), despite the family planning measures which the country has adopted (The World Bank: 1986).

The rapid population growth has been attributed not only to demographic factors such as high levels of fertility and decline in mortality, but also to the improved economic, health and educational levels of the population and especially for people in the rural areas. Our main concern here is how this high rate of population growth affects the welfare and advancement of women in general and in particular their access and participation in the education system. Interrelated with this question, is how the expansion of schooling opportunities in the period of independence has benefited the advancement of women at various levels of the education system.

The relationship and interaction of economic and agricultural development with population growth and expansion of education and the emerging sexual division of labour is complex and needs careful and detailed analysis. As we have observed above, change in land tenure, introduction of cash crops, improved seeds and better methods of farming leading to increased incomes, food production and employment opportunities in rural areas, has also altered the traditional social structure and division of labour between men and women and between age groups. The consequences are that more

family economic responsibilities have been taken up by women. These changes while largely being positive, can also have negative consequences on the status of women which should not be overlooked. We need therefore to make a few observations about these relationships. First, the overall increase in rural incomes and food production has led to increased food consumption and better nutrition. This, coupled with access to health facilities and general education has reduced the infant mortality and increased levels of fertility. This in turn has led to more demand for food, incomes, education and employment opportunities. The changing consumption patterns and rising expectations has confounded the situation leading to further pressure on existing land, various forms of environmental degradation, fragmentation and also encroachment on marginal lands.

Secondly, families faced with these situations have tended to invest more in education, as a means of widening their frontiers of opportunities, by hoping that educated children would move out of the densely populated land into formal employment and thereby increase chances of income remittances (Paterson: 1984). The opportunities which existed for the educated personnel in the sixties fuelled tremendous faith in education which has hardly been shaken even with increasing unemployment among school leavers, in addition to the ever rising costs of education to the family. Girls education at primary school level has been boosted by this hope, particularly in the rich agricultural districts of Kenya (Kinyanjui: 1981).

Thirdly, we need to recognise that despite the achievements and progress made in Kenya since independence, poverty for many rural and urban households remains a painful reality. In the rural areas, the lack of access to land, employment, education, water, health, agricultural technical and credit services, has left many households and individuals without adequate incomes, food and other forms of subsistence (ILO: 1972 and CBS and UNICEF: 1984). The increased population growth has accentuated the problems of pastoralists without livestock as a result of reoccurring drought. Women in this situation, unlike those who have access to land and cash crop incomes, carry heavier burdens of upbringing their families and educating their children.

Consequently girls from these families have less opportunities of attending primary schools and when they do, there is strong probability of their dropping before completing the first cycle. Hence the existing social differentiation is reflected in the access of girls to all levels of education.

Fourthly, the search for employment outside the family farm has led to a situation where most men are absent from their homes for considerable periods of time² the consequences of this, is that most rural households are led by women, and farming and other decisions are left in their hands. Cash crop and food production is often therefore the responsibility of women although not necessarily the registered owners of the land on which production is carried out. At farm level, the women are the decision-makers and we assume that decisions to educate children in the families are increasingly falling into their hands. This may also be true among the households of rural poor. The outcome of this is the increased enrolment of girls in the first two classes at primary level.

In 1984 and 1985 the enrolment of girls in these classes was about 49 per cent of the total enrolment, while in some districts the enrolment of girls was equal or more than that of boys. The proportion of girls in each class however declines as you move to upper classes of primary level cycle.

In summary, the changes which have occurred in the rural areas of Kenya have led to a great deal of differentiation which can be observed in terms of regional, class and gender inequalities (Hangerud: 1984). The inequalities at the social and economic levels tend to be reproduced in the education sector in the way opportunities and resources for schooling are distributed (Hangerud: 1984 309-319). With rising population, and the rising costs of education, coupled with the external factors which the country is exposed to, the challenge in the next decade will be how to maintain the educational gains of the last twenty four years and at the same time promote educational opportunities for disadvantaged groups in the system.

2. This point brought out in a recent study by Safilios - Rothschild, C. and Mburugu, E. K. "Men's and Women's Agricultural Production and Incomes in Rural Kenya" mimeo a paper presented at a seminar on "Agricultural Development, Population and the Status of Women" Nyeri, Kenya September, 2-3, 1987.

III EDUCATIONAL DEVELOPMENTS SINCE INDEPENDENCE

Many changes have occurred in the education sector since independence. The racial system of education that characterised the colonial education was disbanded in 1964 to create a unified national system. At the same time the content of school curricula at all levels of education were revised to incorporate materials which made knowledge of Kenya and Africa central to learning. In some cases new subjects like new maths, business education, industrial education and agriculture were introduced in secondary schools. (Lillis: 1985). Local teachers and administrators were trained and given full responsibility of teaching new curricula and administering the new and expanding school system. With disbanding of the colonial system of education, the country moved from eight years of primary education to seven years of primary, four years of secondary, two years of higher school and three or four years of university education. This structure has now been changed to 8-4-4- system of education (eight years of primary, four years of secondary and four years of the first degree). The system has been implemented at primary level and is in the process of implementation at secondary level. It will be operational at the University level from 1990.

The examination system has changed a great deal since independence when overseas Cambridge Examination Syndicate was the examining and certifying body at the end of secondary school education and at higher education level. In the late sixties this was replaced by East African Certificate of Education which was operated by the three East African countries. This eventually paved way for the establishment of Kenya National Examination Council (KNEC) which has authority on all national examinations taken in the country other than in Universities.

These changes have corresponded to changes in school curriculum and has in most cases enhanced the introduction of local materials in the learning process.

The most remarkable change in education in this period, is however, the quantitative expansion that has occurred at all levels of the system. The table below shows how enrolments at each level have expanded in the period between 1963 to 1984.

Table 1: The Growth of Education, 1963 to 1984

| Level | | 1963 | 1973 | 1984 | Annual Growth Rate |
|--------------------------------|--------|---------|-----------|-----------|-----------------------|
| Primary: | Male | 587,000 | 1,025,000 | 2,269,000 | 6.4 |
| | Female | 305,000 | 791,000 | 2,111,000 | 9.7 |
| | Total | 892,000 | 1,816,000 | 4,380,000 | 7.9 |
| Secondary: | Male | 21,000 | 117,000 | 302,000 | 13.4 |
| | Female | 10,000 | 58,000 | 209,000 | 15.5 |
| | Total | 31,000 | 175,000 | 511,000 | 14.4 |
| University (undergraduates) | | 1963/64 | 1973/74 | 1984/85 | |
| | Total | 370 | 4,450 | 7,120 | 15.1 |

Source: Ministry of Education, Annual Reports (1964-1984)

The quantitative expansion of primary school enrolment in 1984 had reached 4.4 million as compared to 892,000 in 1963. The same pattern is observed at secondary level, where enrolment had reached more than half million in 1983 as compared to 31,000 in 1963.

At the university the figures rose from a mere 370 undergraduates at the University of East Africa to 7,120 undergraduates in the three public universities in Kenya, of which 30 per cent were women. A big proportion of women being enrolled in the faculties of Arts and Education.

This expansion is also reflected in resources which were allocated for education from the national budget. In 1963/64 financial year the country spent 19 per cent of the recurrent expenditure on education, an allocation which increased to 27 per cent in 1973/74 financial year and had reached about 34 per cent in 1984/85 financial year. A crucial question is how women education has fared in this expansion. An analysis of the data in the table above shows that the proportion of girls enrolled in primary schools increased from 34 per cent to 44 and 49 per cent in 1973

and 1984 respectively. The annual growth rate for girls during the period 1963-1984 was 9.7 per cent. At the secondary school level the production of girls enrolled increased from 32 per cent in 1963 to 33 and 41 per cent in 1973 and 1984 respectively. The annual growth rate for enrolment of girls in 1963 to 1984 was about 15.5 per cent as compared to 13.4 for boys. These data show that girls have gained most from the quantitative educational expansion since independence. However, we need to note that there are still serious regional and class inequalities in access and participation of women in education (Hangerud: 1984; Lewis: 1988). While it is not our intention to analyse these forms of inequalities here, it is nevertheless necessary to point out that any strategy which aims at improving opportunities for women in education must take into consideration the existing regional, class and school differences.

IV. SECONDARY SCHOOL OPPORTUNITIES FOR GIRLS

While enrolment for girls at secondary schools has increased to about 40 per cent of the total number of pupils at this level, it is necessary to analyse closely the types of schools attended, the curriculum offered and the quality of education available in general, and in the final analysis the outcome of secondary experience.

The discussion here focuses on the curriculum which girls are exposed to at secondary school level. In doing this we need to understand the type of schools the girls attend in the first instance, as this ultimately affects the quality and type of curriculum the girls are offered.

Table 2 shows the proportion of girls enrolled in different types of secondary schools in Kenya in 1984 and 1985. The first category of school are the maintained secondary schools which are the highly subsidised by the government. These are viewed as the best public secondary schools in the country. They are however, highly differentiated (Kinyanjui (1974) in terms of teachers, science teaching facilities, library and other resources available for the realisation of curriculum goals. On the whole, they are the kind of schools which parents hope their children will get admission to after eight years of education. In 1984, 34 per cent of students attending this type of schools were girls. This proportion remained almost the same in 1985.

a: Types of School Attended and Curriculum OfferedTable 2: Enrolment in different types of Secondary Schools

| Type of School | <u>Sex 1984 and 1985</u> | | | | | |
|--------------------------------|--------------------------|--------------------|---------------------|----|----|----|
| | % of Total Enrolment | | Proportion of Girls | | | |
| | 1984 | 1985 | M | F | M | F |
| Government Maintained | 45 | 48 | 56 | 34 | 64 | 36 |
| Government Assisted | 22 | 21 | 52 | 48 | 56 | 44 |
| Unaided (Harambee and Private) | 33 | 31 | 56 | 44 | 62 | 38 |
| Whole Country | 100.0 (297,000) | 100.0 (270,000) | 60 | 40 | 62 | 38 |

Source: Kenya: Economic Survey, 1986

The low enrolment in 1985 is because ^{there} was no Form 1 class in all schools in 1985, due to change to 8-4-4 system.

The second category of schools are the assisted schools. These are usually community initiated (harambee) schools which are assisted by the government by provision of teachers and in some instances science laboratories. The facilities in these schools are on the whole of average quality as compared to maintained schools. This is often reflected in their average performance in the Kenya Certificate of Education (KCE). In 1985 girls enrolled in these type of schools were 24 per cent of all girls enrolled in secondary schools. Nevertheless they formed 44 per cent of enrolment of this category of schools.

The third category of secondary schools are termed 'unaided' schools. These are the community based self-help (harambee) and the privately owned for profit making schools. School fees are usually higher than in the maintained schools, while their physical facilities and learning materials (text books, libraries and laboratories) are inferior,

if available at all. The teachers are poorly qualified and motivated. In 1985, a third of the girls enrolled in secondary schools were in these schools. Thus in 1984, 44 per cent of the enrolment in unaided schools were girls which should be compared to 34 per cent of the enrolment in maintained schools. In 1985 this pattern showed some change.

What need to be observed here is that girls getting access to secondary education in Kenya are most likely to end up in assisted schools and unaided schools.

In 1984, 62 per cent ended here while in 1985 it went down to 57 per cent. This is a fact which has been observed in the last ten years (CES and UNICEF 1984). The fact that girls on the whole are attending poorer schools need to be borne in mind when assessing the curriculum which they are exposed to at this level.

There is however, need for more research in this field to try and disaggregate the various broad categorization of secondary schools, as it is likely these categories hide inequalities which may be working against the advancement of women education. Coupled with this, it is necessary to note that the increasing burden of financing education which is being shifted to parents, is likely to work against increased enrolment and participation of girls in the government maintained schools which are currently subsidized (Weekly Review: July 3, 1987).

Secondary schools in Kenya are expected in theory to offer to their pupils similar curriculum which is examinable nationally by the Kenya National Examinations Council at the end of four years of secondary schooling. However, what each school offer is differentiated according to the type of school which is reflected by the training and experience of the teachers, available facilities, laboratory, library and class-room) and

3. Ministry of Education, Science and Technology, "The 8-4-4 cycle of Education" mimeo April, 1987; see also a letter to the Editor Daily Nation, 24th September, 1987 "Private Schools can do better" by M. E. Samson.

other inputs essential for accomplishing objectives of a curriculum. As we have observed Kenya secondary schools are differentiated in terms of maintained, assisted and unaided schools which is an indication of the way resources are distributed for the realisation of the national curriculum objectives. As indicated within each of the three broad categories of schools there is added differentiation in terms of quality of teaching staff and learning resources available to students for achieving the set education goals. B. M. Makau (1987) has observed that in the maintained category of secondary schools, current grant-in-aid (from central government) fall far short of the living and learning requirements of the students. We can extend this observation to assisted schools and unaided harambee and private schools which previous research (Kiryanjui: 1974, CRS and UNICEF: 1984) had clearly indicated were poorly equipped to handle secondary education.

And since most of the girls attending secondary schools were enrolled in these two categories of schools, we can conclude they are exposed to situations which are hardly adequate for learning and living at this level of schooling. Consequently, most of these schools do not offer science subjects, a fact which will be observed later on when we analyse performance in examinations taken at the end of the secondary cycle.

The quality and breadth of curriculum offered at each secondary school is largely dependent on the financial resources available to the school, from the government, (if it is a maintained or assisted school), and what the parents can pay in terms of fees and self-help donations. In a private or a harambee school the primary source of finance, is the parent or donations from the community. The financial resources often determine the teachers to be recruited and facilities to be provided. While the rich schools (private and maintained) can afford in addition to the prescribed curriculum to offer a variety of subjects and extra-curricular activities and thereby enormously enrich the learning and living circumstances of pupils, the poor schools (private, assisted and harambee) have often to limit their teaching to the basic requirements, avoiding subjects which require expensive inputs. This affects mostly girls and in general pupils who come from poor households (CRS and UNICEF 1984, Makau: 1986, Lewis: 1986). The Kenya Certificate of Education Examination results of 1985 and 1986 shows that girls were concentrating more on subjects which did not entail expensive teaching inputs and leaving out science subjects.

Hence, opportunities for a broad, high quality and an enriched curriculum in Kenya has been limited to a small number of maintained secondary schools and high-cost private schools. In 1985 and 1986, Kenya Certificate of Education (KCE) examination, these schools were dominant in the top twenty schools in the Country (Weekly Review, February 1986 and 1987).

In 1984 secondary schools were required to prepare themselves for the implementation of 8-4-4 educational structure and curriculum. A wide ranging secondary school curriculum comprising of twenty-nine examinable subjects has been introduced. These subjects have been grouped into four categories out of which students entering for Kenya Certificate of Secondary Education (KCSE) examinations are required to choose at least ten subjects on which to be examined.

The choice of the ten subjects are illustrated below:

| <u>Group I</u> | <u>Group II</u> | <u>Group III</u> | <u>Group IV</u> |
|---------------------------|----------------------------------|---|--------------------------------|
| 1. English ⁴ | 1. Christian Religious Education | 1. Home Science | 1. French |
| 2. Swahili ⁴ | 2. Islamic Rel. Education | 2. Art and Design | 2. German |
| 3. History and Government | 3. Social Educ. and Ethnics | 3. Agriculture | 3. Music |
| 4. Geography | choice of subjects from above | 4. Woodwork | 4. Accounting |
| 5. Maths | | 5. Metalwork | 5. Commerce |
| 6. Physics | | 6. Building Construction | 6. Economics |
| 7. Chemistry | | 7. Power Mechanics | 7. Typing and Office Practice. |
| 8. Biology | | 8. Electricity | |
| 9. Physical Science | | 9. Drawing and Design | |
| 10. Biological Science | | Choice of one subject from Group III and IV | |

4. There will be no separate English Literature and Fasihi ya Kiswahili in the new syllabus. These subjects are now taken as part of English and Kiswahili respectively. KNEC, KCSE Regulations and Syllabuses. *ibid.* p. 5.

Three Possible Choices

- a) English,⁴ Swahili⁴, Government and History, Geography, Maths, Biology, Chemistry, Physics, CRE and Agriculture.
- b) English, Swahili, Government and History, Geography, Maths, Biology, Physical Science, Socila Education and Ethics, Art and Design and Accounts.
- c) English, Swahili, Government and History, Maths, Geography Physical Science, Biological Science, CRE, home Science, and Economics.

Source: Kenya National Examinations Council, KCSE: Regulations and Syllabus 1989-1990, 1987.

Implementation of the new curriculum requires 45 periods a week each of 40 to 45 minutes. In forms three and four, teaching periods are distributed in the following manner: Group I English 6, Swahili 5, History and Geography 3, Geography 3, Maths 6, Chemistry 4, Physics 4, Biology 4, Physical Science 6, Biological Science 4, Group II, any subjects in this group 3 periods. Group III, subjects have 3 or 4 periods depending on choice of Group I; and Group IV subjects 4 periods.

Students in the final two years of secondary education take between 43 to 45 periods a week depending on the choice of subjects taken and this includes one period of Physical Education.

The new curriculum need to be compared with old curriculum which was allocated 40 periods a week which were distributed in the following manner: English 8, Maths 7, Physical Sciences 6, (Physics and Chemistry) Biology 4, Kiswahili 5 and the rest examinable subjects three periods each. Physical Education had one period per week. At 'O' level examination, the candidate had to take English and Mathematics as compulsory requirements, but could enter for a minimum of nine subjects. 4. There will be no separate English Literature and Fasihi ya Kiswahili in the new syllabus. These subjects are now taken as part English and Kiswahili respectively. KNEC, KCSE Regulations and Syllabuses, ibid, p4-5.

From the above analysis we can observe that secondary school curriculum is overloaded in terms of the number of subjects offered and in the duration required to cover curriculum content. Recent research (Makau 1985) has indicated these developments have put a great deal of strains on teachers and parents in their attempt to implement this curriculum. It is increasingly being observed that pupils and teachers have to work extra hours at night, weekends and during the holidays to cope up with the new curriculum⁵.

The implementation of the new curriculum has also meant that schools have to discard textbooks which were used previously and parents who had books acquired when some of their children were taking the old curriculum cannot utilise them. Schools have not only to buy new textbooks⁶ but have also to put up new physical facilities for the 8-4-4 curriculum. Makau (1987) had indicated the sums involved in this process are colossal, and has questioned whether the country can afford this expenditure. In addition to the heavy financial resources required to implement and make this change effective, there are serious equity issues which need to be given serious attention⁷.

5. Weekly Review (January 10, 1987) argued that the introduction of science subjects as compulsory "raised eyebrows and not only because of the widespread lack of physical facilities to teach (them) but also because of the number of periods it has been allocated". In a paper presented at the Education Conference (April 21-25 1987) the Chief Inspector of Schools, Mr. T.M. Sitima admitted that there is too much content for too little time. The Minister of Education, Hon. Aringo announced towards end of 1987 shortened school holidays in April, and August, "to enable teachers to cover the broad and tight curriculum of the 8-4-4 system". Hence school terms will be 14-14-11 weeks per annum. Daily Nation, 19 December, 1987.

6. It has been observed that a number of the text books prepared for the new curriculum have serious shortcomings, see Weekly Review January 10, 1986.

7. See "The 8-4-4 Cycle of Education" a paper prepared by the Ministry of Education, Science and Technology for the "Education Administration Conference, April 21-25, 1987. This shows serious regional inequalities in provision of laboratories, workshops and classrooms.

This curriculum has tended to exacerbate regional, class and gender inequalities in provision of education particularly in provision of physical facilities and learning materials. At primary school level this phenomenon has been observed in many districts and schools which means that the curriculum will not be adequately implemented⁸. At secondary level assisted and unassisted schools will hardly be able to implement the curriculum because of lack of physical facilities leave alone textbooks. And since general science which most schools in these two categories offered to the pupils will be abolished in 1989, these schools will be required to have laboratories to implement the new curriculum⁹. It is quite clear they will not have the necessary facilities in two years time¹⁰.

Another problem which the country is facing in the implementation and teaching of the new curriculum is the lack of suitable and qualified teachers. As the Chief Inspector of Schools has indicated, the "problem in primary schools is quite acute" while "in the secondary cycle, harambee schools and commercial private schools are the hardest hit". Teachers to teach the expanded and compulsory curriculum are difficult to come by. Even before the introduction of the new curriculum there was shortage of teachers for subjects such as Kiswahili, Biology, Chemistry, Physics, Agriculture and technical subjects. This shortage is exacerbated by the requirements of the new curriculum.

(b) The Performance of Girls in Kenya Certificate of Education Examination.

Table 3, below gives data on the proportion of candidates who sat for a selected number of subjects in the Kenya Certificate Examination in 1986. The selected subjects are intended to indicate the subjects which are likely to be taken or avoided by girls at the secondary school level.

8. See Daily Nation, September 22, 1987 "Minister worried by Delay and The Standard September 22, 1987, "AKINGA: Construction of Workshops to Slow."

9. Sunday Nation, September 13, 1987 report of a speech by the Chief Inspector of Schools, Mr. Tom Sitima, "General Science to be abolished in 1989".

10. Lack of facilities for teaching science subjects has made it necessary to bring back the physical science and Biological science into the syllabus. The new curriculum was drawn in August 1987 as an alternative to the previously proposed, and is intended for schools with limited laboratories and other teaching facilities for 'pure' science subjects, (personal communication from K.I.E.).

Table 3. The proportion of boys and girls taking various subjects at KCE Examinations 1986

| Subjects | Proportion of Boys | Proportion of Girls | Total |
|-------------------------------|--------------------|---------------------|-----------------|
| Total candidates | 60.9 | 39.1 | 100.00 |
| English Language | 60.9 | 39.1 | 100.00 (127847) |
| History | 60.8 | 39.2 | 100.00 (89168) |
| Geography | 62.1 | 37.9 | 100.00 (120687) |
| Kiswahili | 60.7 | 39.3 | 100.00 (106153) |
| Christian Religious Education | 57.6 | 42.4 | 100.00 (106269) |
| Mathematics | 60.9 | 39.1 | 100.00 (127847) |
| Biology | 61.0 | 39.0 | 100.00 (72424) |
| General Science | 56.7 | 41.3 | 100.00 (49913) |
| Physical Science | 72.0 | 28.0 | 100.00 (23122) |
| Physics | 77.6 | 22.4 | 100.00 (5610) |
| Chemistry | 69.9 | 30.1 | 100.00 (7670) |

Source: Kenya National Examinations Council, 1986.

While a few maintained secondary schools will attempt to provide the facilities and materials required, the bulk of them will not be in a position to do so (Makau 1987, Daily Nation: 22/9/87). High cost secondary schools, on the other hand will try as much as possible to avoid this curriculum by offering overseas curriculum. There are already schools in Kenya contemplating this option.¹¹ In the final analysis it is the children from poor and middle income households who will be most adversely affected by the new curriculum. Girls secondary education falls into this category.

11. There is unresolved debate in the country whether London GCE is going to be offered by KNEC to Kenya students or become an examination for children of expatriates. See Daily Nation Editorial 24 September, 1987, "What is the use of that Examination".

In addition to inequalities which emerge within the school system, the teaching of science need to be given special attention. As Eshiwani (1984) has shown girls are faring very badly in the science subjects. the curriculum has allocated between 16 and 18 periods per week for teaching of Mathematics and science subjects (Physics, Chemistry and Biology or Physical Science and Biological Science). This allocation means that those who want to do well in the science subjects will have to work extra hard to maintain even the old poor standards. The implications of this to advancement of science education for girls at this level and subsequent levels of education and training need not to be lost to educational planners.

Chances of girls who start secondary education leaving before completing this level are higher when compared with that of boys (Kagia 1985). This phenomenon while observable at this level, is perhaps more serious at primary school level. While pregnancy and lack of financial support account for most of the drop-out at secondary school level, there is likelihood that the curriculum offered, the learning materials the girls are exposed to and the attitudes of the teachers to girls may contribute for much more than realised to this process. An analysis of textbooks for teaching Agriculture at primary school level by Anna Obara (1986) has indicated the erroneous images being conveyed to girls as to who is a farmer in Kenya. The farmer in the textbook is always a male, which is contrary to the situation in the agricultural sector which we described earlier in this paper. Obara (1986) argues that "in failing to portray women in real roles, the textbooks deprives school girls of the models, falsifies the picture of the real world for teachers and pupils alike, and conditions boys to expect men in these roles, which is not conducive to facilitating the social change envisaged by the national educational objectives..."¹² Ruth Kagia (1985) has pointed how these images of women as subservant to men are perpetuated in the society to the extent that they penetrate and pervade the educational materials without raising any serious objections.

12. See also Anna P. Obara, "The Image of Girls and Women in Primary Textbooks in Kenya" (Vol. 1 and 11) mimeo. A project funded by the Rockefeller Foundation for the 1985 World Conference of the U.N. Decade for Women, 1987.

It will be a mistake for us to assume the content of textbooks and materials used at secondary schools portrays favourable images of women and their roles in the society. Girls learning from such materials are likely to have their attitudes and aspirations distorted in such ways as to encourage them to leave school early, to track themselves out of science-based and practical subjects, and those who remained in the sciences to perform poorly in the examination.¹³ Eventually, this leads girls to choose careers which are less paying, non-prestigious and which do not require competence in science subjects.

From table 3 it can be observed that in compulsory subjects, English and Mathematics, all the girls who had entered for the KCE examination took the subjects. In 1986, 39 per cent of the candidates were girls, which was the same proportion in 1985. In subjects like Geography, History and Kiswahili the proportion of girls was the same as observed taking compulsory subjects. These three subjects were, however, taken by a small number of candidates. This should be contrasted with subjects like Christian Religious Education and General Science which attracted relatively more female candidates than males. The proportion of girls taking the two subjects in 1986 was 42 and 41 per cent respectively. The situation also prevailed in 1985.

In the science subjects, however, it is only Biology that the proportion of the girls remained at the same level as their proportion in the total number of KCE candidates. In Physical Science, Physics and Chemistry the proportion of girls taking each subject was 28, 22 and 30 per cent respectively. These data and that of 1985 indicate that on the whole fewer girls are taking science subjects as part of their secondary school curriculum.

We need to analyse the performance of the girls in the subjects which we have selected. Table 4 compare the performance of boys and girls graded as distinction, credit, pass and fail. The best two grades in any subject are designated as distinction, while grades 3 to 6 are credits, grades 7 and 8 are pass and grade 9 is fail.

13. Michael Apple, "Curriculum as Ideological Selection", Comparative Education Review Vol. 2, No. 2, 1976, pp.209-215.

Table 4: Quality of Performance in Selected KCE Subjects
by Sex, in 1986

| Subject | Distinction | | Credit | | Pass | | Fail | |
|-----------------|-------------|-----|--------|------|------|------|------|------|
| | M | F | M | F | M | F | M | F |
| English | 0.1 | 0.2 | 9.4 | 10.4 | 25.7 | 24.4 | 63.7 | 63.6 |
| Maths | 2.5 | 0.8 | 15.9 | 7.6 | 20.4 | 14.6 | 60.0 | 76.0 |
| General Science | 1.2 | 0.3 | 22.3 | 9.6 | 27.2 | 18.6 | 47.8 | 70.4 |
| Biology | 0.2 | 0.4 | 21.7 | 13.9 | 30.3 | 25.4 | 46.6 | 59.4 |
| Chemistry | 7.9 | 5.4 | 37.5 | 30.7 | 29.8 | 30.8 | 23.8 | 34.2 |
| Physics | 4.2 | 1.4 | 38.6 | 26.1 | 26.5 | 26.4 | 30.0 | 43.0 |

Sources: Kenya National Examination Council, 1986.

Performance in English Language in the KCE Examination in 1986 was similar among girls and boys. In Mathematics which is the other compulsory subject the differences are very noticeable. Over three quarters of the girls who sat for the examination failed the subject, as compared to 60 per cent of the boys. For entry into higher education and training institutions candidates require a credit or a distinction performance to be qualified. In Mathematics only 8.4 per cent of the girls had reached that level as compared to 18.4 per cent of the boys. The pattern observed in performance in mathematics correlates to performance in other science subjects although failure rates are lower ranging from 34 to 70 per cent.

(c) Consequences of Secondary School Curriculum and Performance

This data indicate that less than a third of the girls who take mathematics, biology and chemistry, physical sciences at secondary school level do not qualify for access to higher education and training institutions which require high grades (credit and above) in science subjects to be eligible for entry. In this way, most of the girls who complete secondary schools are not eligible for entry into high level careers in science based professions and, technology (ILO-JASPA: 1986,

Kagit: 1985; Njunga: 1986). This situation was evident in our post-secondary technical training institutions and Marenbee (self-help) Institutes of Technology in 1985 where female enrolment was only 25 per cent. If secretarial and home-science courses were not included in some of these institutions, the proportion of females would have been lower.

The pattern of performance discussed above is also observed with 1984 and 1985 data. The overall performance in Mathematics and English has raised a great deal of concern in the last few years, but our analysis show that the situation is worse among girls. As indicated above, over three quarters of the girls who sat for Maths in KCE examinations in 1985 and 1986 failed the subject. This trend is likely to be exacerbated with the introduction of the 8-4-4 curriculum, in a situation where facilities and textbooks are not available for the basic-based pre-vocational curriculum. The consequences of this is that women are going to continue to have limited access to higher education and particularly in the science based professions and in commercial sector and industrial sector. Anne Njunga (1986) has argued that whereas women are discriminated in post-graduate training and promotions, there are other areas of work where such discrimination does not exist. She however emphasizes the need for more women to join careers like agriculture, veterinary science and engineering so as to make an impact and at the same time to "act as models of young girls". While the number entering professional courses at university is lamentably low, the performance of girls in the science subjects at secondary school level will make it difficult for a sizeable number of women to enter into these professions. The impact which Njunga (1986) hopes for might not be realised given the type and quality of curriculum the girls are exposed to all the way from primary schools to secondary schools.

In short, the secondary school curricula being phased out offered only limited number of girls with opportunities to study science. This was particularly so because most of the girls did not have opportunities of attending government maintained schools, which have laboratory facilities and relatively well trained teachers. Secondly, the girls who were taking Mathematics and Science subjects were ending up not performing well in the examinations, which jeopardized their chances of moving up into institutions

of higher education or training. This affects seriously their ability to compete in labour market. In this way, the country is losing a significant proportion of its human resources especially in a field where there is an acute shortage. The curriculum changes which are being introduced as a part of the 8-4-4 system are likely to exacerbate the problems discussed above. Hence there is need for monitoring closely the effects of the new curriculum on the performance of girls in mathematics and science subjects and its implications to access to higher education and in particular science-based professions and technical fields.

V. CONCLUSION

A firm foundation for women education at secondary, tertiary and university levels, and indeed, their access to professions and positions of influence, is based on the rate and quality of participation of girls at the primary school level. It is crucial therefore that we pay special attention to the factors which hinder initial access of girls to schooling, and then the type and quality of primary schooling offered. The quality, effectiveness and the diversity of curriculum provided depends on the experience, training and motivation of teachers, physical facilities (classrooms, laboratories, library etc.) available, textbooks and other learning materials. And for the learning process to be effective, time needs to be available for both teachers and pupils to interact, and concentrate on their respective roles, that is, teaching and learning. While establishment of an effective and efficient learning environment is crucial in the early stages of childhood, the continuity of this process is important in enhancing the acquisition of knowledge, skills and behaviour at all stages of the education system.

While the quality and level of participation of girls at primary school level depends to a large extent on parental factors such as educational background, income and expectations for their female children, we need to emphasize how these characteristics are intertwined with societal factors such as the level and rate of economic development, the status of women, income distribution, regional and class inequalities, and the level of scientific and technological achievement. In Kenya, the resources which have been available to the rural households, as a result of the agrarian and land reform, have influenced the development of education at all levels. The dominant contribution women have made in agriculture and food production has to a large extent fuelled the demand for education for girls (Hangerud: 1984). Hence, since independence, girls education at all levels has been growing faster than that of boys. The high rate of population growth in Kenya has provided added challenge to development in all the sectors of the society. The interaction of all these forces in the society has influenced participation of girls in education. The pressing challenge as Kenya moves to 8-4-4 system of education is whether we can maintain effectiveness and efficiency of the system. Science education for girls need particular attention and emphasis if the past curriculum offered, performance and outcomes are to be rectified.

This paper has emphasized the need for a better science curriculum for girls not only because of the pivotal role which performance in these subjects plays in access to formal employment opportunities, but also from the recognition of the serious need for scientific and technological knowledge and skills among women if increased productivity in agriculture, improvement in health and in family planning are to be realised. Added to this, are the gains to be derived from women who are scientifically literate in the socialization of children (Africa Development Bank: 1986 and Cast-africa II: 1987). The first Congress of African scientists held in Brazzaville Congo, in July 1987, argued strongly the case for teaching of science by recommending that "what African governments need to do is to monitor the teaching of science and the related subjects constantly to ensure that interest does not tapers off, and where it does, to find ways of restoring interest by use of creative teaching aids, incentives and prizes that will motivate pupils".¹⁴ We would add that science education for women need even greater attention.

Kenya is one of the few African countries which have not experienced disruption in its development efforts by internal or external conflicts. In this way, the country has benefited by having continuity in its development policies and programs. The benefits of this continuity can be seen in the developments which have occurred in the agricultural sector and particularly in food production.

The dynamic role which women play in the agricultural sector in Kenya and Africa is now well recognized but for this process to accelerate there is need for calculated interventions in fields of land law, education and training in science and technology, and in provision of financial and credit facilities.

Although Kenya has fared fairly well in the development of education, any continued progress in this field will inevitably require increased expenditure in addition to a careful and efficient utilisation of the available resources and opportunities. To enhance educational opportunities for girls in Kenya, it is therefore necessary that the managers and administrators of schools not only utilize the available human and financial resources effectively but also aim at securing additional resources.

14. African Concord No. 147 July 2, 1987, p.7.

In view of the budgetary constraints facing the Ministry of Education, and the high proportion of recurrent expenditure going into education and training (about 40 per cent in 1987/88 financial year) the task of providing additional resources into this sector and any improvements in the quality of schooling will definitely fall on the shoulders of the parents and harambee self-help activities. Cost sharing will therefore mean a dramatic shift of the burden of financing public education from government to the parents. One would hope that this shift will result into corresponding sharing of responsibilities of administration and management of schools, appointment and discipline of teachers, and quality of curriculum offered. For schools to face up to the challenges outlined in this paper, there is not only need for motivated and qualified teachers, text books, and laboratories, and other basic facilities; but also for schools time to be allocated in such a way that effective teaching and learning is possible.

Secondly, we need to recognize that we are losing many talented people through the curriculum currently being offered. Remedial work need to be instituted in this field. Retraining of science teachers and instituting special science education programs for those who have failed need immediate attention. These programs should have clear bias towards women to remedy the pathetic situation we have analysed above.

Thirdly, there should be deliberate programs to give women who have distinguished themselves in the fields of science and technology leadership positions not only in education, but also in key sectors of the society (Castafrika II: 1987). These will form the role of models discussed above which young girls can emulate. These policy efforts if closely tied to remedial programs for science education for women, can enable them to perform and achieve highly in the sciences and technical training.

The contribution of research in highlighting the situation of women in various fields of development cannot be over-emphasised as a form of creating awareness and in some instances promoting intervention which can be beneficial.

Education researchers should therefore continue to devote time, and their analytical knowledge and skills to the study of the linkages between schooling opportunities (access and curriculum exposure) to the improvement of status of women in the society.

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