ALTERNATIVES FOR FORM SIX LEAVERS.

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muticon/eca/pammd/84/219

Table of Contents.

1. Letter of Submission P. 2
2. Contract Terms P. 3
3. The Institutes P. 4

   Background
   The HIT Training Role
   Training Costs

4. Western College of Arts and Applied Science. P. 9

   Site
   Initial Plans
   Current Operations
   Future Plans

5. Ramogi Institute of Advanced Technology. P.13

   Initial Plans
   Current Situation
   Future Plans

6. Form Six, WECO and RIAT Intakes. P.16
7. The University System. P.17

   Form Six Recruitment Base
   Implications For Upgrading
   Manpower Uses of the University
   Industry Attitudes to Nairobi University Manpower
   Production Reorientation to Serve Industry
   University Based Consultancy Services.
   National Service

8. Some Project Ideas. P.34

   The Rationale
   Expansion of Existing Teacher Education Support
   External Degree in Teacher Education
   External Degree in Business Management and Accounting
   Programme to Support Industrial and Business Attachment
   Conversion of Nairobi Student Residences to Teaching Facilities.
   Support for WECO.
   Support for RIAT.
   Joint WECO and RIAT Support
   Further Actions

9. Summary Conclusions and Recommendations. P.47
10. Tables P.50

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3rd October, 1983

James A. Bukhala,
Chief
Human Resources Development Section,
United Nations Commission for Africa,
Box 3001,
Addis Ababa, ETHIOPIA.

Dear James A. Bukhala,

RE : PAMMD/84/219 CONTRACT.

Enclosed please find the consulting report as per the contract referenced above.

It was a pleasure working for ECA. I hope that in the future we can find ways and means of working together again.

On mode of payment, please sent me a Cheque to the above address.

I think I am entitled to some travel claims. Could you please let me know how I claim these ? The forms you wrote about in your last letter have not arrived yet.

Yours sincerely,

G-C. M. Mutiso.

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3rd October 1984

CONTRACT TERMS. REFERENCE. PAMMD/84/219 OF 31/8/84.

"To undertake a country study on three institutions relative to "Maximizing resource utilization in African Institutions of Higher Learning", determine the extent to which a meaningful interface between institutions of learning and industry could be establish[illegible]d intakes could be increased and thereafter prepare a techn[illegible] report on his findings."

ELABORATION. REFERENCE ORG. 100 (16) CONSER/HRDS 31/5/1984.

"..... we are looking for information on the basis of which decisions regarding how the university can (i) accomodate the two year backlog of intakes ..... (ii) establish an interface with production and service rendering private and parastatal corporations and in particular government ministries could be effected in linking theory and practice, and university consultancy activities with the practical problems in those areas could be affected.

We are also looking for ways of much more meaningful interface and linkage of Colleges of Technology and the nearby industries, as well as adjacent university set up could be established. In this regard we are interested in WECO and RIAT with the Lake Basin, sugar and paper Industries etc. and Moi Eldoret University. ..... "

THE INSTITUTES.

Background.

The Harambee Institutes of Science and Technology (HITs) were created by a political process which started in Kenya in the early seventies. Their genesis is extensively covered in POLITICS, ECONOMICS AND TECHNICAL TRAINING : A KENYAN CASE STUDY by E.M. Godfrey and G-C. M. Mutiso. (Nairobi Kenya Literature Bureau 1979)

In their study the authors showed that the institutes were creatures of local elites who were unsatisfied with the great numbers of students coming into the market without any technical skills. They were also supposed to cater to local communities in the sense that they were to train people to link with the local production processes.

The other major conclusion of the above study was that the institutes would produce people who would become self employed since there was a believe that the local communities would place effective demand on their services.

In the thinking of the local harambee committees there was a lot of talk that the institutes would in the long run become universities. Not very many committees thought through the prohibitive recurrent costs of the institutes. As the authors concluded, this was the one area where the evidence suggested that most of the institutes would never take off without external donors financing or takeover by Government of Kenya.

Nobody anticipated the administrative problems which were to face the institutes once they had collected harambee money from the local communities. The problem with the funds was simply that the various committees were not always on top of the fund-raising since the provincial administration did get involved and at times bypassed the committees in financial matters. This has led to lack of coherent financial records showing the spending patterns of the institutes and relating that to the funds raised and the training needs.

Dissatisfaction with the manner of financial administration did lead to the government to begin the takeover of the institutions in 1980. Initially it was just a programme of taking some teachers to the institutes but by 1984 all the institutes which had taken off (15) had headmasters seconded to them by the Ministry of Education.

All the teachers now are either Ministry of Education employees or they are from technical assistance programmes but still supervised by the Ministry of Education.

The Ministry of Education has also had a planning and coordinating unit for the HITs in the Ministry of Education since 1974 when they were tentatively put into National Development Plan. This unit was essentially used for planning purposes and was initially funded by UNESCO. Currently the Harambee Institutes of Technology Unit is part of the normal establishment in the Ministry of Education, Science and Technology. Since Denmark (through DANIDA) has an extensive programme of training in the HITs, their Programme Administrator works in conjunction with the HIT Unit. The HIT Unit is administered by a Senior Education Officer.

Since 1980 the Government has accepted in principle that the institutes are to be regarded in the same manner as any other training institution and they therefore get a grant-in-aid like any other training institution. Perhaps the most significant government decision was to take the issue of demand for HIT teachers seriously enough in the mid seventies. This led partly to the establishment of the Kenya Technical Teachers College which has gone a long way in producing teachers for the HITs.

Before these teachers were available, the government did initial training of teachers for the HITs in those HITs which took off early.

Kiambu Institute of Science and Technology trained teachers in building construction.

Muranga College of Technology trained teachers in mechanical engineering and electrical engineering. These have now been phased out since there are enough teachers coming into the system in the disciplines.

Rift Valley Institute of Science and Technology started training teachers in agricultural mechanics and is set to phase out in 1985/86.

The teachers who were recruited into these training programmes were Kenya Certificate of Education Level ie. Form Four and they had to have served successful apprenticeship programmes with Directorate of Industrial Training. They were in training for 3 years during which they got two years of skill upgrading and one year of teacher education. They were also expected to pass the craft part 111 professional exam.

After all that they were given the Kenya Technical Teachers Diploma in Technical Education. This is the certificate issued after graduating from Kenya Technical Teachers College.

The HIT Training Role.

Table 1 shows the registration of the various HITs from 1973/74 to 1984/85 financial year. In the first year there was only one HIT operating with only 100 students. This was Kiambu. By 1983/84 there were 15 HITs operating with a combined registration of 3904 students. The HIT Unit argues that in 1984/85 there are 4200 students but they do not give the complete breakdown in terms of specific HITs.

These figures should be compared with the announced plans in the mid seventies of something like 20,000 students expected to have been registered by 1985 when all the HITs were expected to have reached maturity as their individual planners s[illegible]ted. It underscores the cost of technical education which the initial planners did not come to grips with.

Table ii shows that most of the HITs have concentrated on masonry, carpentry, plumbing and mechanical engineering. No figures exist for each subfield. A whole tracer project would have to be undertaken to establish finite figures but it is important to note that the HITs to some extent are duplicating each other in the basic areas of training.

All the people I talked to did not see this as leading to an oversupply problem. The only comments they made is that the HITs may not be satisfying the local demands but training for national demand. This explanation is in keeping with the findings of POLITICS, ECONOMICS AND TECHNICAL TRAINING where as early as mid seventies the authors noticed complaints from the Kiambu Coffee Cooperative Union to Kiambu Institute of Science and Technology complaining that although they had contributed lots of money towards the development of the institute, with the hope that it would train maintenance mechanics for their coffee factories, the course was not started.

Training Costs.

In POLITICS, ECONOMICS AND TECHNICAL TRAINING the authors identified the issue of unit training costs as one of the real bottlenecks for the institutes. In 1975 it was estimated that the per capita annual training cost for Kiambu would be K.Shs.6,000. This led to the institute giving bursaries of K.Shs.3,000 and asking the students to pay the balance, ie. K.Shs.3,000. as fees. Per capita training costs were estimated in 1981 as in the order of K.Shs.15,000. to Shs.20,000. in THE SECOND UNIVERSITY IN KENYA : REPORT OF THE PRESIDENTIAL WORKING PARTY (Chairman C.B. Mackay) The HIT fee structure is shown in Table iii.
These high training costs were the main reason why the institutes did not reach their planned enrolment targets. It is further more the reason that the only ones which took off were the ones which could tap extensive foreign aid sources. It is the reason for the pressure for government to take over the costs of teachers, teaching materials, and equipment, in short the bulk of the recurrent costs. It is the reason that the HITs have serious housing problems.

Since Kiambu started, each year the HITs have sought to get government to assume more of their financial burdens. Initially it was teachers. Later it was equipment. In 1983 HITs demanded money put away by industry ostensibly to train people already working in industry. Kenya Institute of Technology Association (essentially the Principals) put enough pressure on government that for the first time they were given the Training Levy money which heretofore was only going to training in industry. A total of K.Shs.2,989,500 was given to nine institutes. This may in the long run be the most significant financing decision since it will allow the HITs to tap the idle money contributed by industry for training and not used. The fund stands at around K.Shs.150m. in 1984.

It should be noted though that the bulk of the aid to the institutes has been in terms of the donor agencies which have put money for equipment and personnel. The key donors in this, in the recent past have been Danish Government, German Government, American Government and UNDP aid. They contributed K.£.509,020. in 1983/84 for development activities of the HITs. Almost all of it was appropriations in aid. Table v refers.

The institutes have fantastic bottlenecks in their building plans. The foreign donors do not want to get involved as they are in providing some teaching personnel or in equipment procurement.

The HIT Unit is aware that the major bottleneck is for workshops, classroom space, and teacher housing. Yet the Government of Kenya is not as enthusiastic about putting up these as it is for financially supporting other HIT activities. It seems to take them on their word and to argue that buildings ought to be something the HITs should do on harambee basis.

Some of the pressure on buildings and transport recurrent costs will be eased when a Canadian NGO (Association of Community Colleges) program for aiding HITs goes on stream in 1985. It will give K.Shs.100 million in two phases. The actual details on phasing are however not yet available.

It is clear to this consultant that the HITs have come of age in a political sense. They have managed to attract government support and significant resources. There are professionals who are organised to lobby for them. These are the Principals and the Ministry of Education Administrators who operate under the umbrella of the HIT Unit. They have got significant support to evolve towards higher training and to be integrated in the whole technical training process by the need to restructure the whole educational system from next year.

The basic proposal is that there will be an educational system broken into 8 years of Primary Education, 4 years of High School and 4 years of University.

A plethora of technical training institutions have sprung up in the country since independence without their being integrated into a coherent whole and being related to the levels of general education. In attempting to streamline technical training some proposals have been made by the Technical and Higher Education Department of the Ministry of Education, Science and Technology. Although these are not finalised it is important to note the assigned role for the institutes. Table vi refers.

A closer look at it will show that the institutes will be expected to train for diploma level by receiving candidates from two sources. These are secondary schools and technical schools training at the certificate level. There is thus a notion that in the future the HITs will be upgraded since at the moment they are training only at the craft (certificate) level. This obviously will have to be a long term strategy since all the HITs are not yet off the ground.

Perhaps in terms of future plans the most important issue is the formalisation of the HITs in the Ministry of Education, Science and Technology. This is likely to have three clear outcomes.

First the local communities will increasingly have little to say about their running and hence their training programmes. He who pays the piper calls the tune. The Ministry of Education, Science and Technology is the paymaster now. It will increasingly insist that they all get standardised to fit national operations. It is not yet clear whether this will mean that they will be more theoretical and less oriented to practical work which many argue is the weakness of the current technical high schools. This is a genuine fear.

The other outcome is the making of the institutes training grounds for the formal employment sector. Initially HIT's argued in their plans that they were to train for the independent self employed artisan who would have forced them to orient themselves to the needs of the local communities. We shall return to this later since it is at the core of this consultancy. But for the time being we only note that they are all putting up the same courses and that HITs have not taken clear advantage in training for the regions they were established in.

Thirdly as resources dwindle the HITs are more than likely to stress low unit cost courses, like accounting, over expensive courses, like mechanical engineering. A related problem is the failure of HIT catchment industries to support HIT industrial attachment programmes. Industries are now demanding to be paid rather than subsidise HIT industrial attachment programmes by paying students nominal salaries.

WESTERN COLLEGE OF ARTS AND APPLIED SCIENCE (WECO).

Site.

This is a college situated on 100 acres in the provincial capital of Western Province, Kakamega.

Initial Plans.

The initial plans and activities started in 1972 and called for the college to cater to the whole province by having three campuses in each of the three district making the province. Kakamega District was to have a campus in Kakamega town where the concentration would be administration, engineering and business studies.

Busia District would have a campus where the concentration would have been nutritional sciences. Bungoma District would have a site where agricultural and veterinary sciences would have been taught.

These were the plans in 1972. They did not materialise since the politics of the province led to splits. Bungoma district went ahead and created Sang'alo Institute. Busia District is only now thinking about its institute. The province ended up with the campus in Kakamega taking off but not at the planned time.

In the initial plans the Kakamega campus was supposed to start operating in 1974. It was to start courses in mechanical engineering (including general mechanical and motor vehicle, general electrical and electronic, agriculture and water, building production and manufacturing) to cater for 120 Form Four graduates. Similarly it was supposed to start a semi-professional course in business (including accounting, finance, insurance, and management) to cater to 48 Form Four graduates. The plan stated that the college would reach full strength in 1976/1977 when there would be a total of 336 students with 240 in engineering and 144 in business.

Current Operations.

WECO was not to get off the ground until 1977, the year it was supposed to be at full strength. The reasons are, failure to use the province as a catchment area for purposes of fund-raising, failure to get donor aid in the first years and to some extent, the lax administration of the affairs of the college. After the start the enrolment in WECO has been 40,64,88,132,168,167,167,167, for the years 1977 to 1984. Its present strength is just about half of what should have been achieved in 1977 if the initial plans were executed.

The steady and modest growth in enrolment numbers has served the college well, since the departments established have operated effectively compared to other institutes.

WECO has built up capacity for housing 167 students. It also has built up classrooms to accommodate the students. It is however lacking in housing for staff. At the moment the teachers and other staff members have to find housing elsewhere.

The training programme is essentially only in two departments. This is mechanical engineering at the craft certificate level. In business studies department students can take accounts clerks and accountants. Table iv shows the enrolment figures between 1977 and 1984.

WECO also holds short term training courses for water operators for the Ministry of Water Development. This has become an important source of revenue for the college. Many seminars are held by the government in WECO due to its proximity to the Provincial Headquarters. This raises some money.

Since inception WECO has had significant support form DANIDA in the form of teachers and equipment. This source of support has enabled WECO to develop a very sophisticated mechanical engineering production unit which has got to the point that it needs to be headed by a person who is not a teacher. Such a person has been supplied by DANIDA. At the moment a separate production workshop is being constructed to handle the extensive production contractual responsibilities which WECO has taken from government and industry. This will release space in the teaching workshop.

The mechanical teaching workshop is adequately equipped for the student numbers currently enrolled. It is one of the best.

The production activities have generated some significant amounts of money for the college. There are in the order of a million shillings in 1984. They obviously go a long way to support the recurrent costs. It has not been possible to calculate this since the system of record keeping is not only fragmented but for the past years inadequate. The donor kept records for those areas they were responsible and some of the local Principals hardly kept any. The new Principal is harmonising all college accounts now and the data will be available later.

In the last two years WECO has been negotiating with DANIDA to get a foundry and an expert to supervise its operations. This will enable the mechanical department and the mechanical production unit to respond to some of the training and business opportunities in the region. Incidentally there is not any foundry in the province. The delay is only in terms of identifying the right personnel. WECO has started farming the close to 100 acres which is not being used. There is usually a good crop of maize on 50 acres and cattle are kept in the rest of the land area not being used for buildings.

As far as linking with the technological demand of the region WECO has been successful in relating to the demands of the Ministry of Water Development and other agencies in the water sector. Earlier we had mentioned the fact that WECO trains ministry water operators.

More significantly it has got contract to manufacture water pumps for the Finnish, UNICEF, DANIDA and World Bank development programmes taking place in the country. They have improved the Indian Mark 11 hand pump and manufacture it in the workshop as part and parcel of the training programme.

WECO is becoming a major supplier of improved mechanical brick making equipment.

Since 1980 the unit has become a major supplier of slaughter house equipment nationally.

It is a major source of nuts and bolts, energy saving jikos, and all types of steel fabrications.

A water quality laboratory which is the most modern and sophisticated in the country has been established at WECO. This has become the most important water quality centre in the province and the two adjoining ones. It is underutilised since the specialists do not teach in the normal training programme other than the water operators courses which only takes about 4 months annually. It may be worth considering establishing a regular water training course to take advantage of the underutilised capacity.

The strategy of production is to avoid direct competition with the small operator but to manufacture regional essentials with a foundry they would get into sugar and tea equipment manufacture.

Future Plans.

WECO is set to receive a significant amount of support from Canadian NGO- Association of Community Colleges. In phase one of this project WECO will get K.Shs.125,000. in teacher related support, Shs.115,000. to support activities of the production unit. On top of this they will get 2 teachers who will be paid for and thus not becoming part of recurrent expenditure. Other support will be in form of 3 teacher's houses and one vehicle.

On top of this the Board of Governors is considering harambee fund-raising to take care of the urgent needs identified by the Principal. These are a women hostel, repairs and improvements of buildings, and three additional classrooms. These would need about K.Shs.4 million at 1984 prices.

In terms of future training needs WECO would like support for establishing the foundry workshop, foundry teachers and agriculture teachers so as to deepen both the mechanical engineering training and production. WECO would also like support to establish the agriculture (including sugar technology) programme.

RAMOGI INSTITUTE OF ADVANCED TECHNOLOGY (RIAT)

Initial Plans.

This HIT located on the shores of Lake Victoria in Kisumu - a major supply base for the region, was one of the most ambitious. It had planned to start in April 1974 with 300 students. Phase one was to cost K.Shs.20 million and was to be completed by 1977. RIAT could not raise the funds envisaged in time. It had run into political problems about the fund-raising. It was also to run into serious problems of adminstration until the ministry took it over by posting a principal, who was able to contain the various political factions and thus insulate the institute from the incessant infighting in 1980. In the plans the full capacity enrolment was supposed to be 1,000 and was to be reached by 1976. This however turned out to be the year of the first intake.

RIAT planned entry at two levels which reflected the inability of the political factions to agree on the entry level. These were to be at Form Four and at Form Two. The later were to be trained as apprentices for a period of two to three years. If they wanted to they could re-enter RIAT with Form Four level graduates to be further trained for four to five years to get professional technician level qualifications.

The same ambitions were also reflected in the planned courses. These were to be environmental sciences, agricultural sciences (including sugar technology, fish technology, food science and technology, and nutrition), engineering, business and institutional management, art and design (including industrial design, book production and design, fine art, pottery, textile design, and architectural and building technology), paramedical science (including medical technology, pharmacy and clinical sociology) and social sciences (including economics, demography, sociology and human geography). Beyond this RIAT also considered including general studies and training its own teachers.

The planners estimated that initial recurrent expenditure would be K.Shs.2 million the first year and raise up to K.Shs.10 million when phase one ended. To cover this they expected to raise a capitation fee of K.Shs.20,000 per student per year. An endowment fund of K.Sh.60 million was also planned.

These plans were not to be and the college did not start until 1976. Since then it has had the following enrolment, 6, 11, 36, 14, 52, 201, 265, 330, and 400 for the years 1976 to 1984.

RIAT has built a central bloc which houses the offices, the classrooms and is also being used as a dormitory. It has several teachers houses and a dining area. A dormitory bloc is under construction. There is a large workshop on site. By the end of this year the physical plant will be relatively good.

Current Situation.

RIAT has not been able to start a production unit which would help it to meet some of the recurrent costs as WECO has. However this year it managed to buy a stone ballast crusher which is earning the HIT some money. In September 1984 they were given by President Moi a sugar farm which used to be a government experimental farm. This ought to begin them on the long route towards generating some money through production so as to support some of the recurrent expenditures.

In terms of training RIAT has not mounted some of the courses which are desired in the region although curricula were developed. The most significant missing course is the one on sugar technology. Since the college is located on the shores of Lake Victoria which has significant marine and fisheries resources one would have expected the marine and fisheries course to have been initiated. It has not come about inspite of the fact that the curricula was one of the first ones to have been worked on.

Another significant course planned but not being implemented is transport management. They cannot find teachers. Incidentally this specialisation is so lacking in the country that there are no Kenyans with MA. or Ph.D in transport economics. Yet there is demand for it.

Since the overambitious plans were jettisoned on account of costs, RIAT trains building (including masonry, carpentry, electrical installation and plumbing) motor vehicle mechanics, radio repairs, accounts (including accounts clerks and accountants) and secretarial. The intake is students at Form Four level.

All the teachers are employees of the Ministry of Education, Science and Technology save one Canadian who is supported by a grant from her country and who teaches in the secretarial section.

It is interesting that the financial constraints have shifted the training orientation of RIAT to emphasize the business courses at the expense of the technical ones. This is not unlike the experience of the other HITs.

The notion that training was for self employment seems to have run into problems.

Future Plans.

With the completion of student halls of residence RIAT will release space tied in the administration bloc. They intend to increase the level of intake in business subjects and according to members of the board they are to pursue training in marine and fisheries as well as sugar technology. On marine and fisheries studies they have already approached DANIDA but the later are lukewarm. Basically they have not worked in RIAT because they argue there was too much politics. On sugar technology they stand a good chance since the Ministry of Agriculture is interested in assisting them.

RIAT will be able to get K.Shs.85,000, 2 teachers houses, 2 teachers, and one car from the Association of Canadian Community Colleges during phase one of their programme which starts later this year.

In short it seems like the HIT is set to stabilise and to mount those programmes which will be suited to the region. The leadership of the college has now managed to shield it from the turbulence of local politics and this has contributed to some planned growth. It has yet to lead to major donor involvement in the funding or administration of RIAT.

FORM 6, WECO AND RIAT INTAKES.

It is not the practice of these two HITs to take Form Six leavers although less than one percent, according to the two principals, of those who join the accounts sections are Form Six leavers. It is policy for both HITs to take the Form Four leavers. They argue that this is the level for which the local communities raised the initial funds for starting the institutes. I put to them bluntly that they should consider the advantages of the HITs taking the higher level. The comeback was that Form Six offered no advantage either from a training point of view or for that matter the local political tradeoffs. Both Principals and teachers, who were interviewed separately, as well as a few board members, feel very strongly about this. It is argued that Form Six leavers can fend for themselves in the national arena since they are more mature and can be absorbed into regular employment more easily than the masses of Form Four leavers.

These arguments are likely to stand in the way of packaging a system of using the institutes to take on the backlog of Form Six leavers.

Surprisingly the same attitudes are shared by the Ministry of Education, Science and Technology who run both the HIT Unit and the Technical Education Department. It is similarly shared by most donor agencies.

Based on these strong views I do not therefore think the Economic Commision for Africa should even consider getting involved in a programme which will be based on making the Form Six leavers the normal intake level of the HITs. However, this does not mean that the HITs should not be considered for some supplimentary courses for Form Six leavers outside the existing HITs programmes and expansion of existing courses.

THE UNIVERSITY SYSTEM.

Form Six Recruitment Base.

Those familiar with the history of education in Kenya know that the creation of Form Six as the recruitment base for entry to university education is as recent as 1961.

As is correctly pointed out in THE SECOND UNIVERSITY IN KENYA : REPORT OF THE PRESIDENTIAL WORKING PARTY (Chairman C.B. Mackay) the justification for the Form Six system was to create " a means of preparing and selecting students for university education" Through the decade of the sixties this did not present a serious problem since those who went into the programme knew they were being prepared for university entry and they were reinforced in this belief by actually being taken into the university. However by the end of the decade many parents and educational administrators began to question the utility of the Form Six programme, since significant number of the students were not getting places in the East African University system. They had completed a programme which did not suit them for employment.

The creation of the University of Nairobi in 1970 was tied, to some extent, to the dual concern of parents and educational administrators who felt that Kenyan students were not getting enough places in the University of East Africa. Nairobi then was only a branch of this regional university.

Table vii shows the pattern of production of Form Six students and the numbers taken into the University of Nairobi and its constituent college - Kenyatta University.

From this table it is clear that as early as 1970 that the university was only taking about 48 percent of those who sat the Form Six examination which is the major selection tool for university entry. By 1975 the university was only able to take barely 19 percent of all the candidates.

In 1980 the university was only able to take 16.5 percent of those candidates who sat the Form Six examination. This situation deteriorated further so that it is estimated that the intake of the 1983 class, which will take place in October 1984, will only be 16 percent. It is further estimated that even with the creation of Moi University in Eldoret this year, and the intakes of Baraton University together with United States International University - the only two private universities in the country. only about 12 percent of the 1984 Form Six leavers will be able to get University places locally.

This pattern will hold over the next two years but by 1989 when Form Six will end, the universities will only be taking between 9 and 10 percent of the candidates.

The Ministry of Education, Science and Technology does not have very finite figures on the numbers of Form Six leavers who get university places overseas. However I have been told that they cannot be more than 5 percent of the candidates each year. The bulk of the Kenyan students overseas are from Form Four and other lower training institutions.

Of course as the crisis of university entry has deepened, there has arisen other institutions which have taken Form Six leavers as material for their training inspite of the fact that the curriculum was not designed for them.

The point one wants to emphasize is that the Form Six educational programme which was initially started because of [illegible]eived needs of university entry has long passed its usefulness.

As more numbers came through Form Six, the university entry standards were raised as the last three years statistics shown in Table viii. This table also shows that the demand for places in the university continue to grow as more and more candidates apply.

This shortage of university places was worsened in 1982 by the closure of the university as a result of riots. Since no Form Six level students were taken by the university that year it means that from 1983 there are two Form Six years in the market. The 1982 candidates were taken in the university in 1984. 1983 candidates will be taken in October, 1984 for academic 1985/86 and so on.

Between 1984 and 1988 it is estimated that in any given year there will be between 30,000 - 50,000 Form Six leavers with at least 10,000 to 15,000 of them who have minimum university entry qualifications competing for university places if the pattern of the last 3 years is maintained (see Tables vii and viii).

Estimates suggest that university places over the next four years are to be in the order of only 7,000 if Nairobi and Kenyatta maintain their current intake of between 2,000 to 3,000 as shown in Table ix. If Moi University comes up to its full strength of 3,200 in 1986 as shown in Table x and the private universities take another 1,000.

Obviously there would be a shortfall of another 7,000 to 8,000 students qualified for university entry but not able to get any places. It is these that some have looked upon as possible material for recruitment into the HITs.

For those who argue that should note that, as shown in Table i, the institutes could theoretically only take about 4,000 if their total training capacity was converted to recruit Form Six leavers. As we pointed above (see page 16) this is not likely since there is opposition to making HITs training institutions for Form Six leavers.

Egerton College which trains in agriculture has announced that it will be granting degrees soon. The plans are not yet finalised but since it takes about 500 students both at the Form Four and Form Six level, it would not really make a dent in the problem of surplus Form Six leavers even if its planned expansion allows it to take about 1,000 students at "A" Level. It is doubtful whether it would choose to totally convert to all Form Six intake which will be abolished in 5 years.

A detailed current manpower survey is not available but THE SECOND UNIVERSITY REPORT systematically looked at the technical training institutions which were taking students both at the Form Four and Form Six level. These are shown in Tables xi to xvii. Altogether they would take 4,000 students if they were all upgraded to take Form Six leavers.

The National Polytechnics (Mombasa, Kenya and Eldoret) can possibly take 4,000 students. Their enrolment is shown in Table xix.

Four teacher training colleges (Kagumo and Siriba, Kisii and Moi Teachers have been assigned to train teachers at higher level. Their combined enrolment is 600 in 1984 and will rise to 880 in 1988.

Other institutions which could conceivably take Form Six leavers are the Teacher Training Colleges specialising in training science and technical subjects. These are Kenya Science Teachers College which has an enrolment of 265 and Kenya Technical Teachers Training College which has an enrolment of 200. (see Table xx.)

All the above institutions theoretically could with minor expansion take between 16,700 and 24,200 students annually as shown in Table xxi.

Before leaving this section, we should note that there is a significant body of Kenyans studying abroad. The figures and countries for 1981 are shown in Table xviii. Current estimates put the numbers around 10,000. No doubt overseas education will continue to attract some Form Six leavers but we do not know the numbers.

Implications of Upgrading.

Before discussing the implications of upgrading it is important to note that there are proposals to change the entire educational system in the country.

This will come about as a result of the start of the commonly called 8;4;4 system. All it means is that there will be basically 8 years of Primary schooling, 4 years of High schooling and 4 years of University education. All levels are expected to become much more scientific and technical than has been the case to date.

Since the new system is to begin in 1985 there will not be any Form Six available for recruitment upward in 1989. From that year the universities will be expected to take into their first year the Form Four leavers.

Given the fact that the policies related to 8;4;4; have been stated and are being implimented any concern for Form Six leavers is for at least programmes which will take care of them for the next four years. It is doubtful whether such a programme can be planned and implimented.

There are real problems with the rationale for planning any programmes to take care of the numbers discussed above for only four years.

To begin with the Ministry of Education, Science and Technology has already written off the Form Six leavers in terms of their policy attention. Concentration now is in terms of planning the curricula for Primary and Secondary. Curricula for Primary Schools is ready. Curricula for Secondary Schools is being worked on.

Significantly no new curricula is being thought out at the university yet. It will be done after seeing the curricula of the High Schools, proposed Middle Colleges (which will include HITs and existing Technical High Schools) and the National Polytechnics.(see Table vi for the future tracking system).

The university will have rethink its curricula since it will be getting new products who are trained in totally different curricula which will greatly emphasize science and technical subjects.

One of the reasons Science and Technology were added to the Ministry of Education is to link the training institutions to the different terminal levels ie. primary,secondary and university.

Other ministries in government are also aware that there will be no Form Six leavers coming into the market in four years. It is doubtful they will take a programme for four years only.

Private sector has never been really happy with the Form Six material when they went into labour employment. Industry argues that Form Six does not make good material for skilled training since they have high expectations. Besides the curricula was geared to producing for university entry and has never been converted to produce terminally for the market.

It should also be clear that the Form Six level does not command as much political attention as the Form Four. Thus the general public is more than likely to pressurise the State institutions to come up with some solutions for either furthering skill education or creating employment for the Form Four leavers.

This attitude comes in part from the political economy of the country existant since the people started the HITs in the early seventies. They were seeking to find solutions for the Form Four leavers.

Infact it can be argued that the pressure for the new 8;4;4;, system which will require the university to take at the Form Four level is no more than the acceptance of educational planners and intellectuals of the thinking of the wider political economy which argues that the training problem area is the Form Four leavers.

Of course the main selling of the 8;4;4; has not been this but rather that the school leavers at all levels will have got skills to make them self employed in agriculture in the rural areas. This is in keeping with the structure of rationalising the educational system since around 1974 when educationists started scrambling to bypass the intellectual framework of the phenomena of the colleges of technology. All educational debates in the country since the momentum of the HITs have hinged only on the issue of technicalisation of the educational system for self employment.

Since the economic depression related to the OIL SHOCKS of the late seventies, industry has not maintained the employment rate it did up to the seventies. This has tended to confirm to parents and the state that the future lies in technical education for self employment - preferably in the rural areas.

These facts are so central in current public thinking that they lead this consultant to conclude that the strategy of upgrading the intake level of the above institutions will not be tolerated by educational planners, the rest of government and the parents who ultimately pay for the education.

Manpower Uses of the University.

When the idea of creating Form Six as the recruitment base for the university was implemented in 1961 it was rationalised in terms of the need to expand university training in the later years to produce manpower for the public sector. This picked momentum in the sixties as pressure for Africanisation grew.

The usual British educational system argument operated. This is an argument which states that the public sector usually demands people with general degrees who can be absorbed into the public sector and then specialise either on the job or be trained at a higher level later on. This argument tends to emphasize subjects which will produce general administrators, hence the preference for liberal arts.

Table ix shows the production of manpower by the university since independence when only 18 students graduated. In the decade of the sixties, as pressure built up for the Africanisation of the public service, parallel pressure built up for increasing the numbers of Kenyan students coming out of the University of East Africa.

By late sixties the feeling of the public, and government was that the desired expansion rate would only come about if the country created its own university inspite of the expense. Public sector demand for people with second degrees created pressure for graduate programmes in the decade of the seventies. One of the earliest to be established at the University of Nairobi, was the Bachelor of Philosophy in Economics which was tailor made for the Ministry of Finance and Economic Planning. Other graduate programmes in education and agriculture, medicine, diplomacy training etc. were started and expanded in the seventies.

It is significant that by 1983 the university was producing more post-graduates than the undergraduates it had produced in 1969, the last year it had operated under the umbrella of the University of East Africa. These is shown in Tables xxiv and ix.

The pattern of undergraduate production has though still remained within the British mould of favouring the liberal arts. This is reflected in Table xxii which shows the production in terms of faculties from 1971 to 1983.

For the last four years, if not longer, there has been impressionistic evidence that some university graduates were not getting readily employed. It is argued that some (perhaps as much as 10 - 15%) were in the job market for periods of up to a year.

This has particularly hit graduates from the liberal arts. No tracer study on graduate employment exists.

These impressions were given credence this year by President Moi who, when talking to university students directed the Civil Service to take all of graduates coming into the market this year (1984) into public employment. But, significantly, he also in the same meeting told the students that they should tell their colleagues that from 1985 the government will not gurantee employment for all university graduates. This is the ultimate recognition of the end of the university role of training primarily for the public sector.

Given that this recognition has come from the Chancellor of the university himself, it may be worth while for the university to rethink its training role. In that it will have to work within the confines of the existant political economy. Some of the parameters of this have been documented. Others can only be derived out of actions in some significant sectors.

THE REPORT ON THE SECOND UNIVERSITY can be seen as the most coherent rethinking on the university level manpower needs of the future. In it, the argument is coherently made for technical education at the university. It goes further to identify faculties which must be emphasized and ranks them in descending order as : 1. Technology. 2. Agriculture. 3. Faculty of Science. 4. Veterinary Medicine. 5. Forestry Resources and Wildlife Management. 6. Social Sciences and Development Studies and finally, 7. Faculty of Information Sciences.

Table x shows that the biggest faculty, technology, would have 33 percent of the undergraduate enrolment. Agriculture is second with 25 percent of the undergraduate enrolment.

Discussions with some members of the Presidential Working Party elucidate the fact that the mood of the country, (they held hearings all over the republic) is to get graduates who can handle technology. To produce them, universities must recruit students with a sophisticated scientific base which would be professionalised at the university level to take care of priority areas of agriculture and industry. Hence the priorities set in THE SECOND UNIVERSITY REPORT.

The policy implications of these conclusions from THE SECOND UNIVERSITY REPORT - should be paid attention to since the project is off the ground.

Beginning in October, the Department of Forestry is going to start at Moi University in Eldoret. All the basic facilities will be there. The necessary administrative structures have been created. This has taken place in the last two years inspite of the major arguments, put essentially by donors, that nobody would finance the Second University. It underscores the commitment to the political economy arguments that the university level education ought to be technical so as to give the nation the desired manpower for future development in both agriculture and industry.

There is also evidence contained in the 1982 Visitation Committee Report on the University of Nairobi that there is going to be pressure to get the University of Nairobi to reduce the dominant liberal arts training.

The Visitation Committee was appointed by the Chancellor, President Moi, in 1982. Although this document is not widely circulated, participants point out that it has far reaching recommendations which will affect the role of Nairobi University in the long run. Among them is the idea of hiving off the constituent college - Kenyatta University - to allow it to concentrate on education as a full fledged university. This is in keeping with the continuing shortage of teachers at all levels.

In the Visitation Committee Report there was proposed a reorganisation of Nairobi University into separate colleges. To some extent this was part of streamlining the administration of the university but more significant is the notion that the professional colleges ought to be given more opportunities to grow. In that sense the preferred future budgetary support is for the technical and professional colleges eg. the College of Engineering and Architecture and College of the physical and Biological Sciences over College of Social Sciences and the Humanities.

Whereas the University of Nairobi has been pre-occupied with the implimenting the reorganisation since 1983, and, has not started thinking about its future role, there is pressure to also go more technical in the sense of emphasising the basic science and scientific subjects. Table xxiii shows the various colleges of Nairobi University.

Another key political economy issue affecting the University of Nairobi is the separation of student housing from the Office of the Vice Chancellor - the top administrator of the university. This has to be seen in the context of the fact that since its creation, all undergraduates at the University of Nairobi have been housed. A new parastatal has been created to deal with accommodation outside the Office of the Vice Chancellor.

Many in the country see this as the first step towards abolishing the practice of housing students and converting the already existing space to teaching uses.

Of course there is no agreement on the issue of housing, but, a significant body of opinion in educational circles claim that it would be possible to expand the University of Nairobi, FOURFOLD, if the housing space is converted to teaching purposes. The argument is made that the students would be able to find accommodation in town since the university is urban. Now that their accommodation problems are handled elsewhere delinks housing and education at the university administrative level.

The idea of using accommodation space for teaching purposes was discussed by the Visitation Committee but it remains controversial. It is however an idea worth considering in the long run since it would release significant resources for expansion of Nairobi University enrolment.

It may be worth the Economic Commission to ponder this as a possible project since it will greatly increase university places.

Industry Attitudes to Nairobi University Manpower.

As we have discussed above the bulk of the liberal arts manpower produced by the university go to the public sector in the first instance. They only get to industry later, usually trading on the experience

Similarly some of the professional schools products are directly absorbed by the public sector. This includes fields like medicine and agriculture. There are a few faculties like commerce and architecture who split their people almost equally to the private and the public sector. The School of Journalism has for a long time produced sponsored graduates who are given leave by their employers both in public and private sectors. The sponsors must be happy with the university training or they would not continue to sponsor students.

Given the places graduates have initially gone, the university cannot be faulted for not developing meaningful relations with industry in the past. Its clearly defined goal from 1961 was to train for the public sector and in some respects it has done just that. Now it must reorient itself.

Before outlining some of the considerations of this reorientation, it is worthwhile to evaluate the relations between the Faculty of Engineering and the private sector since its experience maybe important in deriving a new role for a more technically oriented university.

To begin with there does not exist in the university a programme where the university pays for the necessary industrial attachment for the students in engineering. The attitude of the university has always been that those in industry who want to employ engineering trainees ought to pay the students something since they are contributing their labour to the particular industry. On the whole students under industrial attachment get K.Shs. 2,000.

In the sixties when the numbers of engineering students seeking industrial attachment, were few and the economy was buoyant, some industries and parastatals did take some of the students and paid them nominally.

100 percent of all engineering students at the university were given industrial attachment up to 1975. By 1980 only 50 percent were so attached. In 1984 only 30 percent has managed to get places for industrial attachment during training. These are mainly in parastatals.

Since the SECOND OIL SHOCK many of the industries and parastatals argue that increased costs militate against their taking students for industrial attachment. The argument from industry is that they are bearing a cost when they take a student who is not familiar with the production process.

The same cost arguments are made by the private consulting engineers who take significant numbers of engineers from the university as revealed to this consultant by some members of the Institution of Engineers of Kenya, the professional engineering body in the country.

It costs money when students have to slow down production lines so as to familiarise themselves attached with production. Such an argument is serious since it means students are not able to get the experience of working in industry as part and parcel of their training programme.

Some members of industry argue that they might be more amenable to taking students for industrial attachment if the university were willing to assume the burden of paying the students some stipend rather than asking the particular industry to pay. In such a situation they would at least tolerate the disruptions of training new personnel in their production lines.

As far as engineering training content is concerned it is important to note some ideas from one researcher of the engineering profession in Kenya who aptly summarises the historical source of training and its dysfunctionality. Paul Bennell in FORMATION OF LABOUR MARKETS IN KENYA 1918 - 1979 (IDS. Working Paper No. 379 February 1981) argues that : "The historical development of technical training in Kenya has been based largely on the British model, with the result that the structure of engineering training has been conceived on the strict delineation of professional engineer, technician, and artisan categories ... The intervention of the state via provision of university level training has been of even greater significance than for technicians and artisans where employers have been more intimately involved in the training process. More specifically, since the training of the majority of engineers has not been sponsored by employers, the required output of engineers has been based almost exclusively on manpower projections and furthermore, the content of training has been determined by additional factors which have not been directly derived from the effective demands for engineers emanating from the economy and, in particular, the private sector. " (pp 10 - 11.)

Bennell argument can be expanded further by pointing out that the dependent economy dominated by foreign ownership and members of the Asian Community is not likely to put effective demand on training engineers since their employment and promotion patterns favours lower levels of training and importing foreigners to fill the higher engineering and technical levels. This has been the experience of the Kenyanisation Bureau.

The point about multinationals and Asian businesses not wanting to employ indiginous technically trained personnel is worth paying attention to, since it does not just apply to the engineering level alone but is also being found among the HIT graduates as the experience of WECO and RIAT testify.

It seems to this consultant that the universities will have to come to grips with the problem of placing technical students in industry. They will have to find ways of financing the industrial attachment from their resources and not to rely on industry.

Students are usually paid between K.Shs. 1,500 and 2,000. per month in industrial attachment programmes.

Since the multinationals and large Asian businesses control the industrial lobby they have resisted the university's bid for Training Levy money to be used within the university. For example the Faculty of Engineering has sought Training Levy money to use for its industrial attachment programme for more than 10 years but to date it has not been successful.

Now that the HITs who apparently have more political muscle have established claim on Training Levy funds. I do not see why the university cannot establish claim to getting some of these funds.

It is important that students get practical training in activities related to their training. So far the medical students who are attached to hospitals seem to have the most coherent programme. Such programmes should be worked out for all other faculties. Here we are not talking about the National Service which since this year will be taking those students entering the universities. It is practical training in those industries or activities related to the student training.

The university will also have to get more aggressive in supervising such programmes so that industry does not just shunt those attached to it aside. This was recommended in 1978 by Dr. Francis J. Gichaga, then Chairman of Civil Engineering Department, University of Nairobi, in Study of Cooperation Between Industry and Educational Institutions Training Engineers and Technicians (mimeo. 1978).

If the university is to move towards meaningful programming of university education it will of necessity have to convert its courses into units of shorter duration than the year long courses inherited which give very little scheduling flexibility. This is recommended in the 1982 VISITATION REPORT and should be implimented immediately.

Production Reorientation to Serve Industry.

It also should be clear that the university has to reprioritise its training. A closer look at Tables xxii (a),University of Nairobi Production Pattern 1971 - 1983,clearly shows the training bias for liberal arts with education taking the lead with 4722 graduants. Arts graduants are second. Clearly they should not be. Basic Science graduants are third, closely followed in fourth place by engineering. Commerce is fifth, with Medicine sixth and Architecture, Design and Development being seventh. Agriculture, the mainstay of the nation, is a distant eighth. Veterinary medicine is ninth with law being tenth. The eleventh rank has Adult Studies and Journalism.

A closer look at University of Nairobi Production Patterns 1980, 1981 and 1983 as shown in Table xxiv is even more disturbing than looking at the pattern over the past thirteen years.. Arts undergraduates have jumped from 142 to 547 between 1980 and 1981. They dropped to 472 in 1983. All Arts graduants jumped from 195, to 535 the same years. Education graduates are not expanding as dramatically nor are the faculties of agriculture, engineering, commerce and basic sciences.

A case can be made that if the country is to move into serving industry and the nation as we break the almost complete dependence on agriculture, the need for expansion of university manpower would be in basic sciences, technical fields like engineering,agriculture and commerce and finally adult education. These have not been expanded in Nairobi University as dramatically as the liberal arts in the past three years. This pattern needs breaking. A first step is a systematic study of the demand for the technical fields in the future. This will require fairly extensive research since it will have to be based on alternative futures. So much of what goes for national demand for technical people is no more than stock-taking. This point is made by the Faculty of Engineering in "Problems Facing Engineering Profession in Kenya in Respect of Training of the Necessary Manpower (Mimeo 1981), which was a response to Paul Bannell's A Quantitative Assessment of the Utilisation of Engineering Manpower in Kenya (IDS Working Paper No. 381. 1981).

A special comment on Adult Education is appropriate. To date the university has only produced 171 undergraduates. The Institute for Adult Studies should have been set up as a place where those already employed would get external degrees.

Thus those who wanted,would improve their educational opportunities.

Since this opportunity was missed it maybe time the university thinks of offering an external undergraduate degree. This strategy would be important from two points of view. The first is the Unit Cost of the degree. It would be cheaper than the present system. The second would be to allow professionals to improve their skills without taking time out to attend university.

Graduate external degrees should also be initiated.

University Based Consultancy Services.

The pattern where the university based institutions were seen by government, the private sector and donors as a major source of consultancy services is past. During the decade of the seventies many of the local consulting issues were put to the institutions of the university by those concerned. Leading in this was The Institute for Developing Studies. The Bureau for Educational Research also participated. The Institute for Population Studies was active. So was the Institute for Adult Education. The Institute for African Studies had not begun extensive consulting until it began cultural and anthropological work for the Ministry of Finance and Planning three years ago.

Faculties extensively consulted on all manner of issues in the past. In 1978, the Faculty of Engineering felt the pressure of the work coming to it to the extent of setting up a specific consulting unit-Industrial Research and Consultancy Unit. The idea was that the unit would handle all the work coming to the faculty members from industry government, and donors.

The Institute of Developing Studies and most others have collapsed as a source of consultancy services because of problems of leadership and the taking of work from the institutes to private consulting firms. The major client - the Government of Kenya - has felt that the quality of work coming out of the institutes did not measure up to the work produced in the sixties and the seventies. This has meant more work being given by government to private consultants.

In the Faculty of Engineering, the Industrial Research and Consultancy Unit has had a very short life where right from the beginning it was bypassed by most of the engineers since they could get work as individuals and they did not see the need to channel work, which they get out of their personal reputations through the unit. The government and donors never really used it as they had used the Institute for Development Studies or the Institute for Population Studies.

The Industrial Research and Consultancy Unit was set on a system where it would charge the clients only $\frac{1}{3}$ of the commercial rates. Of its basic charges the university was to take 20 percent, the technicians 60 percent and the individual consultant 20 percent. This, the consultants argue, is not good business from their point of view. They therefore bypass the unit save for those few whose formal positions demand that they show some work done through the unit, eg. the dean, and some depertment chairmen.

There was not a commercial arrangement for the Institute for Development Studies or any of the others. All Institutes assumed that since staff were on university salaries, they would do research and consultancies for the Government of Kenya essentially as part and parcel of their work. They only were required to teach few courses so as to feed the full-time research experience to the teaching departments. This was not a realistic assumption by the university from a commercial point of view. With the growth of local consulting firms outside the university, and the establishment of foreign consulting firms in Nairobi for the region, there is extensive demand for the talent locked in the university.

The university has not been able to match the rewards of the private consulting firms some of whom are creating their own research capacities and thus usurping even the research role which ought to be the monopoly of the university. This is more serious when local University Staff have their own consulting firms.

The reason for the university being by-passed is essentially the fact that it has not allocated significant amounts of money towards research and further-more a cumber-some administration. Enterprising faculty support their research needs by working in consulting firms which enables them to generate some funds for their own research funds.

Many of the donors who give research funds have since the late seventies refused to channel them directly through the university since they argue they cannot get proper accounting for the funds. They now give funds to specific researchers. The university had by mid-seventies started charging researchers some money out of the personal research grants, as it argued, to cover its expenses. The irony of this argument was that it was charging a lot for just accounting for the funds. Its vehicle hire charges were higher than commercial rentals.

These factors have made the university less effective in competing for research and consulting funds be they from the government, donors or industry.

Given the bureaucratic inefficiencies of the university as an administrator of research and consulting funds, this consultant does not see it competing with the consulting firms who are spreading their network to tap markets the university has not even begun to think about. eg. rural cooperatives and businesses.

These problems of university consultancy militate against the adoption of the model of the Technology Consultancy Centre of Kumasi University of Science and Technology in Kenya. That succeeds since it is not under attack by a powerful and to some extent more responsive private sector consulting system.

National Service

The idea of National Service for the country has been around for more than five years. It has fluctuated from being an idea for all Form Four leavers, to an idea for all Form Six leavers to the latest version - a programme for Form Six leavers who are to join the university.

The rejection of a comprehensive service is based on the prohibitive costs. This is suggested by the development costs shown for the National Youth Service in Table xxv which was initially supposed to administer all national service programmes. These are project specific and it is hard to structure new programmes until the NYS is reorganised.

As late as early this year it was expected that the National Youth Service - which has evolved over the years as a training ground for CPE and Form Four school leavers - would mount skill courses for the university entrants. This has not come about.

Those university students due to join in 1984 were taken in the national service. They were not mixed with the regular National Youth trainees. Neither were they trained in any particular skills. They were essentially given army boot camp training and a few random lectures by University Lecturers which did not follow any curriculum.

I do not therefore see the National Youth Service as offering a solution to the Form Six backlog problem.

The Form Six leavers who have 17 months between the time they sit the examination and when join the university only spent 3 months in the national service. Expectations that this hapharzard programme will be extended to 12 months seem unrealistic given costs.

SOME PROJECT IDEAS.

The Rationale.

There is no doubt that countries like Kenya will have to get into much more industrial production if in the future they hope to feed their populations which are growing very fast.

To get to industrial production derived from and supporting agriculture, there will be need to generate the professional and technical people who will on the outset modernise agriculture and then get agricultural derived products to support processing industries initially.

This future strategy is central in the thinking of the planners in the Ministry of Finance and Planning but it has not yet percolated to all other governmental institutions (including training institutions) and industry. Such a strategy assumes a sequence of discrete support for some key institutions.

First and foremost it assumes support for an educational system which will become much more scientific and technological. The main bottleneck here being provision of teachers, equipment and classrooms at all levels.

The second level of priority is the production of technical and professional personnel who will be responsible for the technical and professional innovations which will have to come from both industry and agriculture. These will be people who can get into technical design supervision and production. Significant numbers of them will have to be specialised fields of engineering including agricultural engineering and business. Again shortages of relevant trainer skills, equipment and recurrent costs are problematic.

In A PROPOSAL FOR THE DEVELOPING COMMONWEALTH : THE NEED FOR ENGINEERS AND TECHNICIANS AND HOW TO MEET IT EFFECTIVELY (Donald L Mordell and John F. Coales. A Report to the Commonwealth Board on Engineering Education and Training, London May 1983) is an argument presented that for growth to occur many more technical people have to be produced now to service the future. Some of the desired increases are shown in Tables xxviii to xxxi.

We present this data only to show orders of magnitude and not necessarily in support of it or the projection methods.

The report suggests that for Kenya to maintain its current GNP/Capita or increase it by 2.5 percent or 5 percent, it will still need many more technical and professional people.

In the three alternative scenarios, 0 percent growth, 2.5 percent growth and 5 percent growth, the country would need 72,000 ; 126,000 ; and 216,000 professional and technical people between now and 2,000 AD. as shown in Table xxix. Of these technical and professional people required, present stock of engineers is only about 1,500 but, 10,800 ; 18,900 ; and 32,400 would be required for the different scenarios to growth as shown in Table xxx. Since current annual output of engineers from the university is less than 200 (see Table xxiv) there is clear need for expanding production of engineers.

Similarly with present stock of 2,000 technicians and the required 43,200 ; 75,600 ; and 129,600 for the alternative scenarios as shown in Table xxxi, there is need for expansion of technician training.

These figures should be considered by those who feel that the country is rushing to too much technical education particularly given the fact that this report is not some wildeyed proposal for going into heavy engineering.

The report states "that the most effective way to develop is to encourage endogenous technology including rural development and simple machinery. Such operations need not be highly intensive either in capital or energy but they will provide productive employment in the technical sector ----- The next stage is development of small scale local industry and manufacture, firstly to meet the demands of rural development and later to branch out into supplying the domestic market and later an export market." (p 23.)

Training must, though, start immediately since it takes so long to produce the desired professionals. These conclusions are in keeping with the articulated policies of the Kenya Government.

The second important rationale must be the provision of teachers for the very expanded Primary and High School systems.

One of the nightmares of doing research in education in Kenya is getting accurate the numbers of teachers in the system. The desirable categories are never quite available. We present some of the available data in Tables xxxii to xxxv.

Table xxxii shows the distribution of the qualified primary school teachers between 1964 and 1975. Table xxxiii shows the qualifications of teachers in Primary and Secondary Schools between 1976 and 1982. Finally Table xxxv gives us the different types of schools, and teacher qualifications and the estimated extra requirement in 1985.

Teacher demand will be for different types of teachers since the new 8,4,4, system will require both new specialisations and teachers at the higher levels of qualifications.

The problem of unqualified teachers in the Primary and Secondary schools is highlighted in Tables xxxiii and xxxv. Close to half of the primary school teachers are untrained in the years where data is complete. In the secondary schools, there are more untrained teachers than trained since the beginning of the eighties. This pattern in the opinion of Ministry of Education, Science and Technology is likely to continue over the next five years.

These trained teacher shortage figures are worse when one considers that there are significant numbers of non-citizens in the educational system as shown in the dated data in Table xxxiv. No current data is available on the numbers of non-citizen teachers but estimates in the ministry suggest they are, on percentage basis, proportional to the 1979 figures but perhaps worse since many non-citizens are in HITs and Polytechnics.

Signigicantly some of the non-citizens are in the crucial areas of maths, science and technical subjects.

The Second University report suggested that the country would need an extra 40,594 teachers whose distribution by teaching institutions is shown in Table xxxv. Current thinking in the Ministry of Education, Science and Technology suggest that this projection which saw the national teaching force as being just about 174,000 by 1985, under-estimated the demand by about 30,000. If the national teacher demand is around 200,000 in 1985 it is not inconceivable that it will jump over the 250,000 mark over the next four years.

This underscores the importance of training teachers. It is estimated that the real recurrent costs for training of a primary school teacher is K.Shs.470 ; a science teacher K.Shs.1,570 ; a graduate teacher at Kenyatta University College K.Shs.3,120. as shown in Table xxvi. Those who make the estimates argue further though that these sums are not being spent. The recurrent services are therefore deteriorating.

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Expansion of Existing Teacher Education Support.

It seems to this consultant that the least complicated programme which would take care of the Form Six leavers and which has a good chance of being mounted soon is a programme in teacher education. This is so since there is not only demand for it but the whole university system could get involved immediately.

It is important that the Economic Commission for Africa internalise that when one is talking about university life in Kenya one should be thinking of four institutions. These are Nairobi University, Kenyatta University College which is in the process of breaking away from Nairobi University and setting up separately, Moi University which starts in October 1984 and finally Egerton University which is in the process of transforming itself to produce agriculturalists and agriculture teachers.

Nairobi University does not have a teacher training programme but all the others, save Moi, have. Moi University is to begin its teacher education in 1985/86.

There are other institutions worth considering for support if ECA. is to finance or support in some other form, a teacher education expansion programme which will essentially be geared to taking care of the Form Six backlog. These are Kenya Science Teachers College, Kenya Technical Teachers College, Siriba Teachers College, Kisii Teachers College and Moi Teachers College. Similarly as the educational system demands more technical and science teachers, the three national polytechnics (Kenya in Nairobi, Mombasa and Eldoret which is yet to start) should also get support to increase the numbers of those who may want to go into teaching.

I am aware my terms of reference limited me to the University of Nairobi but I thought it my responsibility to make the observations above to put the issue of teachers in the national context.

If the client only wants to limit the programme to the University of Nairobi it will naturally be either to its constituent college Kenyatta which is in the process of becoming independent, or expanding production of science graduates in Nairobi who could go into the system as approved teachers on graduation.

Since the Kenyatta programme has most of the disciplines programme, support would be easy since it is only expansion of existing programme which will be done. (see Table xxiii (b) for recent Kenyatta production).

Kenyatta University has land for expansion. It, like most other institutions, has buildings shortage. At the same time if it is expanded quickly it will get teacher shortages itself since the graduate programme is not producing anywhere near enough university level teachers.

The problem of university level teachers shortage is underscored in the Second University Report which argues that were Moi University to take 5,000 students it would need 300 university level teachers. This ratio is a good working figure for expansion of other university teaching programmes. Thus, if Kenyatta was to expand from its present enrolment by taking an extra 1,000 Form Six school leavers to train as teachers, it would require an extra 60 teachers at the minimum.

Capital costs cannot be given by this consultant since the records of the institutions concerned are not in a format which could give some guidance. Perhaps the construction of Moi University will give us realistic estimates when its capital development is complete.

External Degree in Teacher Education.

The University of Nairobi has considered giving an external degree programme but has not initiated one. It may be that the ECA. would be interested in initiating such a programme. In this consultant's view such a programme for teachers would be highly welcome. The university is now seriously considering the starting external degrees but the thinking is still diffuse. It has not yet focussed on producing teachers.

Such a degree programme can be seen as the alternative to the continuing capital development of Nairobi University's urban site given the fact that getting extra land is becoming a problem. Similarly there are those who argue that students should be moved from the centre of town.

A teacher education external programme may be an easy project to fund and administer particularly if the university starts it at the graduate and undergraduate levels simultaneously.

The graduate component would be useful in training university level teachers.

The undergraduate programme can simply be targeted at increasing the number of secondary school teachers from the Form Six backlog.

It may even be possible to structure a post graduate teachers diploma to train those graduates in the educational system who did not get education training. These are the so called approved teachers.

In discussing with Nairobi University officials there was much more support for an external degree programme than for any other possible programme. The Vice Chancellor argues that with K.Shs.7m he can take 300 students immediately.
This I think the ECA should keep this in mind in evaluating possible programmes.

External Degree in Business Management and Accounting.

One of the areas the university can build up good links with the industry while simultaneously fulfilling a national shortage, is in developing programmes which will produce accounting, management and planning personnel out of an external degree programme. Some of the individuals who teach in the Faculty of Commerce at the university claims that there is demand for this kind of degree. They and other researchers also argue that one of the major national bottlenecks is the lack of sufficient trained personnel in business management both in the public and private sectors.

External degrees in business subjects are relatively easy to begin since by the nature of the subject matter, programmes can be mounted by drawing on a lot of part-time lecturers.

I am assured by the Faculty of Commerce that they have not had any problems recruiting part-time lecturers from outside the university any time they have wanted them for specialised courses. Business specialists are an important bottleneck in the long run development of the country. Unfortunately this fact has not been widely appreciated in society.

It seems to me that the Form Six leavers, some of whom are paying exorbitant prices for training in private business colleges, would easily be recruited into such a programme. They would find work in the private sector which to date is extremely short of this type of person, not to talk of the public sector which has chronic shortages of business specialists, particularly in accounting and financial administration.

Incidentally the fastest growing area where such people would find ready opportunities is in the cooperative sector which has only begun to hire such people but cannot get them trained fast enough in the Cooperative College which estimates that the sector can take 2,000 graduates in business now !

They are not available since nobody anticipated that this sector would diversify from producer to saving coooperatives rapidly. It may be worth ECA time to consider a special program to channel Form Six backlog to this sector through a business management course.

Another point is important in thinking about. This is the role of external business management degrees in the 8,4,4, system. To date the few products of the Faculty of Commerce go into the commercial firms and very few of them are left to become teachers either in the secondary schools or in the commercial private colleges or for that matter in the Harambee Institutes of Technology. It is the retired accountants, secretaries and book-keepers who are being recruited by the Teacher Service Commission to take up posts in the secondary schools and the HITs as business management teachers. They do not make very good teachers. Second, the 8,4,4, system will make very great demands on business education right from primary school to secondary and other terminal training institutions since all curricula proposed include business studies. It should be the responsibility of the university to help in training for this serious national shortage. No teacher training college is specialising in training in business education, simply because of shortage of such trainers at prices which government can afford. Ministry of Education, Science and Technology argues that the few qualified business teachers (essentially trained outside the country) end up in the private sector.

Programme to Support Industrial and Business Attachment.

Part of my terms of reference were to look for programmes which build up relations between the University, WECO and RIAT and industry. To some extent this does not fit well with the other parts which emphasize reducing the Form Six backlog. However in my discussions with those concerned the issue of who finances any attachment of students in training is fast killing any programmes which allowed students to get practical experience as part and parcel of their training.

The ECA should note that only 30 percent of university engineering students managed to be attached in 1984. WECO has in the past managed to place all its mechanical engineering students until 1981, but since then they have only placed about 75 percent. RIAT has never placed students until this year when they placed only 65 percent after very extensive campaigning. None of the commercial subjects students are placed either at the University, WECO, or RIAT.

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From an industrial and commercial training point of view, to train people in theory without any experience in a production and business situation is not satisfactory.

Industrial and commercial attachment as part of training is failing since the training institutions expect the firms to pay the student nominally when attached. This is not possible now that most industries claim to be hit by either infaltion or recession. Most firms insist on being paid at least what they have to pay the students and being idemnified by government on workmen's compensation.

I took this matter of workmen's compensation with the Commissioner of Labour and his position is that such trainees would automatically be covered if the parent institutions did claim. None of the three institutions have claimed so far.

On the issue of nominal pay to students the institutions will have to find the money.

If ECA is interested in building support for relation with industry, I consider it extremely important that it funds a pilot project on industrial attachment until the national system finds ways and means of financing such industrial and commercial attachments.

One way of financing such a system from a national point of view maybe to tap the training funds locked up in the Industrial Training Levy which every employer contributes and is supposed to claim from it any training expenses for his personnel. It does not work since the contributors do not utilise it. Many in Ministry of Labour argue this is a deliberate move by multinationals and Asian businesses to bloc the national training effort. It is time the university follows the HITs, who have claimed and effectively too,that they train for the national demand and they should get Training Levy funds.

Before this issue is resolved it could be useful if ECA started a project to support industrial and commercial attachment for the institutions it has identified in this consultancy. Such a programme should emphasise attachment to intermediate local companies to build up support for the institutions and to generate service. It is the small businesses who need the service most.

Since university students get only K.Shs.2,000. in most of the attachment programmes and HIT students get about KShs.1,000., such a programme need not be expensive.

Conversion of Nairobi Student Residences to Teaching Facilities.

The idea of converting Nairobi University student residences to teaching facilities has been considered as a solution to its growth problem. Some have argued that given the prohibitive costs of building new facilities it may be worth considering making Nairobi a commuter university.

These ideas are at times vehemently rejected by some associated with university education who argue that such conversion would lead to qualitative drop in standards. Even they concede that such a move would release significant resources to allow anywhere from double to fourfould increase in university enrolments.

Now that there is acceptance that the number of people to enter university is problematic, whether one only thinks of the backlog of Form Six or looks to 1979 when the university will be looking for entrants from a population of about ½ a million Form Four leavers, it may be time to actually designate consultants (a planner, an educationist and an architect) to actually work out the cost implications of such conversion.

The idea is controversial and there is not national agreement on it. But, this consultants view is that it will have to be considered objectively soon since national resources do not allow the country the luxury of completely housing all or for that matter the majority of the university students.

I believe such conversion will be the cheapest way of increasing university enrolments. If coupled with conversion to the unit courses system it may well lead to much more effective physical and manpower use by Nairobi University.

ECA should seriously consider the possibility of establishing dialogue with the University of Nairobi along these lines to see whether the conversion idea can lead to expansion of enrolment. Given the conflicts the idea generates, I doubt that such dialogue will lead to an effective programme which will affect the Form Six backlog before 1988.

Support for WECO.

As shown in the analysis section, WECOs most immediate demand in terms of improving the teaching and production activities which tie it to local industry is a foundry and personnel to teach foundry techniques. This I think the ECA should seriously consider.

The second item needing support in WECO is teachers for agriculture. An agricultural programme would have to be tied to not only expanding the teaching staff and classrooms but dormitory space which is in maximum use with boys and girls using the same bloc.

Both the foundry and agriculture programmes would fit into the business and agricultural needs of the community WECO is serving since they would enable it to get into fabrication and repairs of agricultural equipment particularly for sugar and tea. Incidentally WECO identified the need of a foundry in its search of a manner for serving the sugar jaggeries which do not get services in the area. Other equipment related to the production of tea, maize production and milling in the region need repairs. WECO studies further show that a foundry would enable the production unit to generate work for supporting the recurrent costs.

My terms of reference asked me to look into ways WECO and RIAT can link with the Moi University at Eldoret. Since this university will take a longtime to establish its industry links, it may be a good idea for WECO to accept some of the Moi University students in its production unit if the problem of financing industrial attachment on national basis is not resolved soon or ECA accepts the financing project on this aspect covered above.

Such a relationship would get Moi University students to actually work in a unit producing for local communities. On its side I feel that one of the priorities for Moi University ought to be to start such a production unit - since it has an extensive programme in textile technology and agriculture, it should concentrate on those initially - for its graduates and not to just go the conventional way of haveing only teaching workshops. Similarly the target industries should be the small scale individual operators and cooperatives. In current development thinking and research, that is the level of adaptation and innovation.

I have discussed with WECO officials the possibility of starting an extension programme to service the surrounding community in mechanical, water-quality, secretarial and accounting. Later, this could be expanded to include agriculture problem solving and any other programmes they initiate.

The only limitations to starting such a programme now are transport and materials. WECO expressed interest and argued they could write up a proposal along such lines if a donor was keen. It is an idea worth pursuance by ECA since we do not have formal structured consultancies for the local communities by such level of institutions. The Kumasi Centre would be a good proto-type of what goes into such a consultancy service. The students could be required to run this as part and parcel of their training.

My terms further stated that I should consider the paper industry at Webuye, Their interest is just to get one or two industrial attachment students. Since they, like most other multinationals, import significant numbers of technical people from outside (India mainly), they are not likely to relate to local institutions , like WECO, meaningfully.

WECO strategy of concentrating on tea, sugar, and maize industries is sound and should be encouraged.

Support for RIAT.

RIATs most urgently desired support is for teachers and equipment. Such support will enable it to start courses in sugar technology, marine and fisheries studies and transportation management.

These three fields of teaching are of importance from a national point of view. They have not been started inspite of plans for them since teachers in these specialisations are hard to come by in the country. The ECA could play an extremely useful role for this HIT by looking for teachers in these specialisations from without.

As far as sugar technology is concerned, if WECO gets the foundry, RIAT should not get another one since they are near each other. RIAT should specialise in the chemical processing side of sugar technology. If the two HITs specialise this way, they can give complimentary services to the region. More basic though, would be the different training they can give to their students by moving them to each HIT to take the relevant bits of training from it.

The second order of need for RIAT would be in support of its building materials production unit which at the moment is small. It can be expanded with a little more money for equipment which will allow RIAT to become an important building materials centre.

Again it is interesting that the two HITs will not become competitors in production of building materials since WECO only produces brick-making equipment and has not got into building materials as such.

I believe that the ECA should seriously consider making RIAT an East African regional centre for marine and fisheries studies given its strategic location on the shores of Lake Victoria. Such studies would cover marine transportation and study of making fish a significant source of proteins for the region in general.

Boat building is an industry existing in the region and its modernisation through training and extension should make a significant contribution to the economy of the East African region.

Joint WECO and RIAT Support.

Table xxvii shows the development estimates of the Lake Basin Development Authority. This is the authority which is partly responsible for the development of the region embraced by the two HITs.

To date not much has been done by the two HITs and the Authority. The reasons, I was told by the HIT administrators was that they were not in a position to offer support to the Authority but, with the beginning of agriculture programs in the HITs, they will be in a better position to support some of the development programmes in the Authority.

Significantly some of the authority programmes eg. wells, are served by the Mark II pump from WECO Production Unit. Also RIAT's building materials Production Unit sells to the Authority

Since the Authority is likely to get involved in the future in marine and fisheries programmes, any projects between ECA and the HITs should bring it into consultations.

Sugar Industry employs significant numbers of technical people in the region. Details of educational and occupational levels are shown in Tables xxxvi and xxxvii with systematic consultation between the industry and the two HIT's in training programme development, some of the manpower needed can be trained in the region's context. ECA could play a broker role in this.

Further Actions.

The terms of reference were not clear that the consultant should go into project design specifics. Hence this consultancy has been handled at the level of generating relevant information and identifying possible project ideas.

In the event that ECA selects some of these to be pursued to the level of project design, this consultant would be happy to provide services towards that end.

SUMMARY CONCLUSIONS AND RECOMMENDATIONS.

1. Harambee Institutes of Technology (H.I.T's) have come of age and have significant professional and administrative support for evolving into higher training levels.
2. In the future HIT's are expected to recruit their trainees from both secondary schools and technical schools training at the certificate level.
3. HIT's will be expected to train at the Diploma level.
4. The production unit WECO supports a significant part of the recurrent costs.
5. WECO's activities in the water sector are significant for the region. They should be expanded by initiating training programmes.
6. The planned foundry related activities would compliment WECO's training in mechanical engineering and the production unit.
7. RIAT's production unit in building materials should be expanded.
8. RIAT is not yet training in sugar technology, marine and fisheries studies and transport management which were planned inspite of local demand.
9. There is not political or community support for making Form Six the level of HIT intakes.
10. Form Six was introduced into the educational system as the selection level for University.
11. By 1988 when Form Six level will be abolished, the Universities will only be taking about 9 - 10% of Form Six leavers with minimum entry qualifications.
12. Although many educational institutions could theoretically take all those Form Six leavers meeting university entrance requirements it is not likely to happen. Policy attention is currently on the restructuring of the educational programme which includes abolishing Form Six. Industry is not interested on focussing on this level which will only be around for another four years.
13. The University was essentially used for producing manpower for the public sector since 1963.
14. The Universities will be under pressure to produce technical manpower for industry and agriculture in the future.

15. Industries are not supporting industrial attachment programmes as they claim to be short of funds. They would like the University (and other institutions) to pay the student attachment costs.

16. The economy, dominated by trans-nationals and Asian businesses,is not likely to put effective demand on the training of local engineers and by extension other desired technical and professional personnel.

17. The University of Nairobi must get into unit course system to ensure flexibility in terms of training and its manpower use.

18. Similarly the university should start external degree programmes related future technical and professional manpower needs.

19. University based consultancy services are not competitive with the private sector.

20. The fragmented management and projects and high cost of the National Youth Service have militated against a coherent training programme for national service.

21. Possible projects for ECA in WECO, RIAT and University of Nairobi can be justified on the need for producing more technical and professional people.

22. ECA should consider a support programme for expanding existing teacher education institutions to take Form Six leavers.

23. ECA should consider supporting external degrees in teacher education at the undergraduate level by taking Form Six leavers.

24. ECA should consider supporting external degrees in graduate teacher education to produce university level teachers.

25. ECA should consider supporting an external degree in business management and accounting, taking Form Six leavers.

26. ECA should consider initiating a support programme for BOTH industrial and business attachment.

27. Industrial Training Levy Funds should be used to pay for a national industrial attachment programme.

28. ECA should consider funding an extensive consultancy involving a planner, an educationist and an architect, to generate data on the possibility of converting University of Nairobi student residences into teaching facilities.

29. ECA should consider supporting WECO to establish a foundry and to get teachers for a foundry techniques course.

30. ECA should consider supporting WECO's agricultural programme, including teachers.

31. WECO, RIAT and Moi University could usefully work together in a complimentary production unit based on WECO and RIAT existing units.

32. ECA should consider funding an extension programme for WECO to outreach in mechanical engineering, water-quality, secretarial services and accounting. Such a programme could later be extended to RIAT and Moi University.

33. ECA should consider support by way of teachers and equipment for RIAT in sugar technology, marine and fisheries studies and transportation.

34. ECA should consider support to RIATs building materials production unit.

35. RIAT and WECO should only start complimentary sugar technology programmes.

36. ECA should aid WECO and RIAT negotiate longterm training for the sugar industry.

Table i GROWTH OF HIT STUDENT ENROLMENTS

INSTITUTES	73/74	74/75	75/76	76/77	77/78	78/79	79/80	80/81	81/82	82/83	83/84	84/85
Rift Valley							455	530	630	900	1200	1200
Muranga			30	30	60	145	189	264	266	252	453	442
Kiambu	100	150	150	150	178	178	354	354	444	444	444	444
Ramogi				6	11	36	14	52	201	265	330	430
Kaimosi				120	120	160	200	200	256	256	272	275
Kirinyaga					62	41	53	47	161	183	238	240
Sangalo					25	75	125	125	95	135	183	173
Kimathi								108	132	157	210	313
Western					40	64	88	132	168	167	167	160
Gusii			11	11	23	21	35	40	66	93	161	175
Coast									24	48	102	116
Ukamba										24	48	17
Moi											34	70
Meru											54	48
Embu											N/A	N/A
TOTAL	100	150	180	217	516	720	1513	1822	2443	3924	3904	4103

SOURCE : HIT. Unit. 1984.

Table ii HITs, LOCATION, COURSES AND 1983 REGISTRATION.

INSTITUTE	DATE OPENED	PROVINCE	DISTRICT	COURSE	STUDENTS/ENROLMENT
Kiambu	1973	Central	Kiambu	1. Masonry 2. Carpentry 3. Plumbing 4. Electrical Installation 5. Secretarial	432
Gusii	1975	Nyanza	Kisii	1. Capentry 2. Masonry 3. Plumbing 4. Electrical Installation 5. Secretarial	161
Kaimosi	1971	Western	Kakamega	Business Studies	275
Muranga	1976	Central	Muranga	1. Mechanical Engineering 2. Electrical Engineering 3. Carpentry 4. Home Economics	269
Ramogi	1976	Nyanza	Kisumu	1. Masonry 2. Carpentry 3. Plumbing 4. Electrical Installation 5. Motor Vehicle Mechanic 6. Business Studies	320

Table ii cont.

INSTITUTE	DATE OPENED	PROVINCE	DISTRICT	COURSES	STUDENTS/ENROLMENT
Western	1977	Western	Kakamega	1. Mechanical Engineering 2. Business Studies	154
Rift Valley	1979	R. Valley	Nakuru	1. Agricultural Mechanics 2. Masonry 3. Carpentry 4. Electrical Installation 5. Plumbing 6. Textile 7. Business Studies	1200
Sangalo	1977	Western	Bungoma	General Agriculture	
Kirinyaga	1979	Central	Kirinyaga	1. Carpentry 2. Masonry 3. Plumbing 4. Textile	258
Kimathi	1979	Central	Nyeri	1. Carpentry 2. Masonry 3. Plumbing 4. Business Studies	210
Coast	1981	Coast	Taita/Taveta	1. Business Studies 2. Carpentry 3. Masonry	106

Table ii cont.

INSTITUTE	DATE OPENED	PROVINCE	DISTRICT	COURSES	STUDENTS/ENROLMENT
Western	1977	Western	Kakamega	1. Mechanical Engineering 2. Business Studies	154
Rift Valley	1979	R. Valley	Nakuru	1. Agricultural Mechanics 2. Masonry 3. Carpentry 4. Electrical Installation 5. Plumbing 6. Textile 7. Business Studies	1200
Sangalo	1977	Western	Bungoma	General Agriculture	
Kirinyaga	1979	Central	Kirinyaga	1. Carpentry 2. Masonry 3. Plumbing 4. Textile	258
Kimathi	1979	Central	Nyeri	1. Carpentry 2. Masonry 3. Plumbing 4. Business Studies	210
Coast	1981	Coast	Taita/Taveta	1. Business Studies 2. Carpentry 3. Masonry	106

Table ii cont.

INSTITUTE	DATE OPENED	PROVINCE	DISTRICT	COURSES	STUDENTS/ENROLMENT
Ukamba	1983	Eastern	Kitui	Dryland Farming	48
Moi	1983	Nyanza	S. Nyanza	Business Studies	48
Meru	1983	Eastern	Meru	General Agriculture	48
Embu	1983	Eastern	Embu	Masonry Plumbing Motor Vehicle Mechanics Business	24

SOURCE : HIT Unit. 1984.

Table iii

FEES STRUCTURE IN INSTITUTES

INSTITUTE	SUBJECTS/YEARS	FEES PER YEAR K.SHS.
Rift Valley	All Subjects	2,500
Muranga	All Subjects	2,500
Ramogi	Technical Subjects	4,500
	Business Subjects	3,000
Kaimosi	All Subjects	4,000
Kirinyaga	All Subjects	2,400
Kimathi	All Subjects	2,000
Sang'alo	First Year	3,740
	Second Year	2,890
	Third Year	3,220
Western	All Subjects	4,200
Gusii	All Subjects	3,000
Coast	All Subjects	1,800
Ukamba	All Subjects	3,000
Moi	All Subjects	3,000
Meru	All Subjects	3,000
Kiambu	All Subjects	3,000
Embu	N/A	N/A

SOURCE : HIT Unit.

Table v

H.I.T DEVELOPMENT ESTIMATES

(K£)

	Approved Estimates 1982/83	Approved Estimates 1983/84	Estimates 1984/85
Miscelleneous (Danida)	-	21,000	10
Miscelleneous UNDP	-	10,000	300,000
Equipment (Danida)	75,000	188,000	248,000
Equipment (West Germany)	222,760	300,000	-
Equipment USAID	-	10,000	150,000
Buildings - HITs	-	-	250,000
Gross Expenditure		509,020	948,010

SOURCE : Development Estimates.

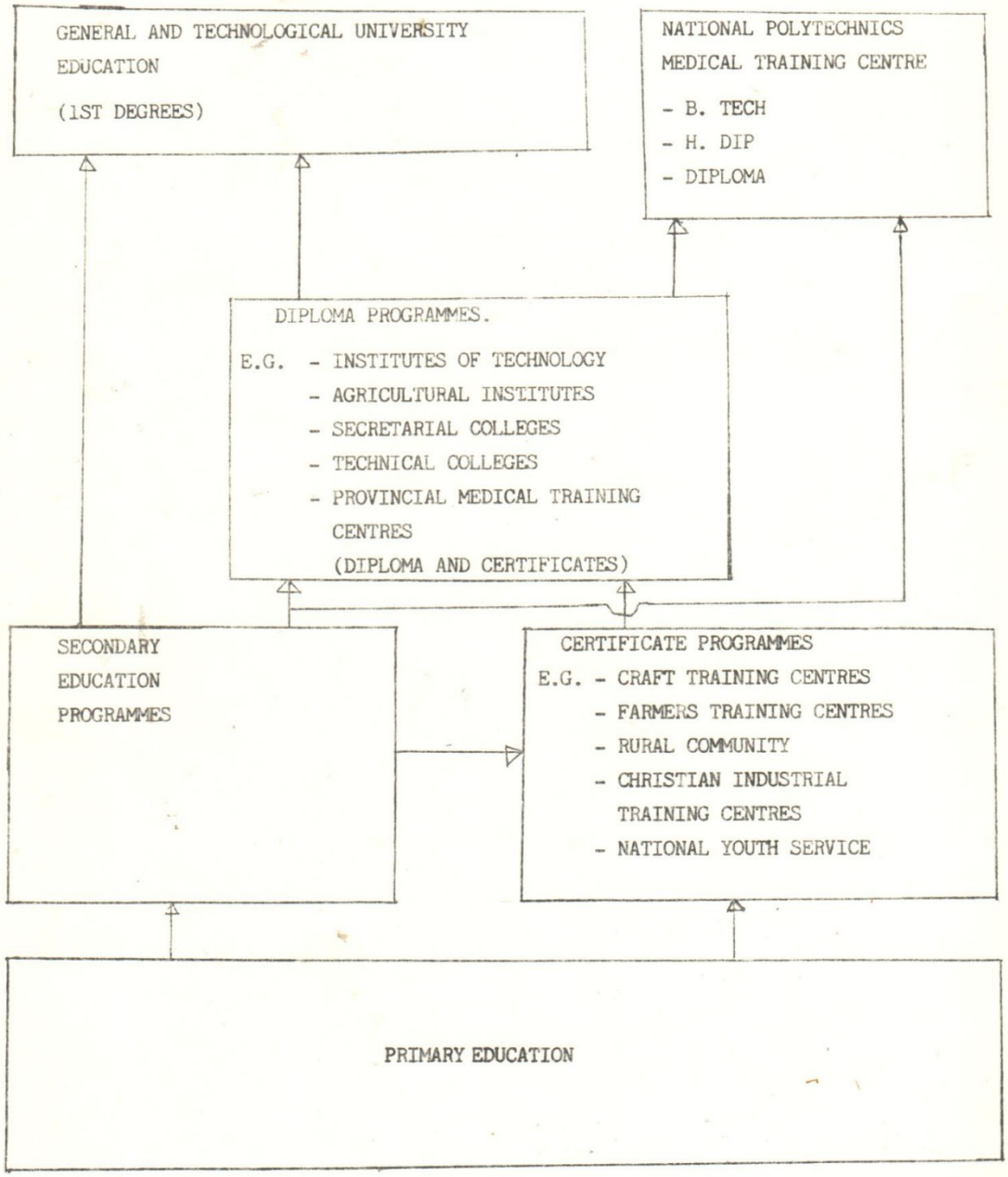
WESTERN COLLEGE OF ARTS AND APPLIED SCIENCES

STUDENT ENROLMENT 1977 - 1984:

YEAR	COURSE	SEX M.	SEX F.	TOTAL
1977	Mech. Engineering	23	-	23
1978	" "	29	-	29
1978	Bus. Studies	26	1	27
1979	" "	17	2	19
"	Mech. Engineering	24	-	24
1980	" "	15	-	15
"	Bus. Studies	36	6	42
"	Water Operators	48	-	48
1981	Water Operators	91	-	91
"	Mech. Engineering	23	-	23
"	Bus. Studies	21	7	28
1982	" "	30	3	33
"	Mech. Engineering	21	-	21
"	Water Operators	74	-	74
1983	" "	43	-	43
1983	Bus. Studies	33	10	43
"	Mech. Engineering	20	-	20
1984	Water Operators	17	-	17
	Totals	591	29	620

Table vi

TECHNICAL EDUCATION AND TRAINING
PROGRAMMES IN 8-4-4- SYSTEM.



SOURCE : Technical and Higher Education Dept. Ministry of Education, Science and Technology.

Table vii

NUMBER OF FORM VI LEAVERS AND THE NUMBER OF CANDIDATES ADMITTED INTO NAIROBI UNIVERSITY AND KENYATTA UNIVERSITY COLLEGE - 1970 - 1983.

Year	F VI leavers (Including Private Candindates)	No. admitted into Nairobi & Kenyatta University	No. left over
1970	2,672	1,279	1,393
1971	3,488	1,215	2,233
1972	3,953	1,641	2,312
1973	5,602	1,735	3,867
1974	6,459	1,469	4,990
1975	7,998	1,519	6,479
1976	7,493	1,804	5,689
1977	8,655	2,461	6,194
1978	8,429	2,592	5,837
1979	11,032	2,611	8,421
1980	12,306	2,028	10,278
1981	13,000*Est.	2,553	10,447
1982	14,000*Est.	2,598	11,402
1983	15,500*Est.	2,500*Est.	13,000*Est.

SOURCE : Republic of Kenya, Ministry of Higher Education and University of Nairobi.

Table viii

"A" LEVEL APPLICANTS AND UNIVERSITY INTAKE 1981 - 1983.

YEAR	NO. OF APPLICANTS *	NO. WITH MINIMUM ADMISSION REQUIREMENTS	NO. ADMITTED
1981	9,877	4,438	2,542
1982	11,366	4,446	2,598
1983	11,725	5,000 Est. **	2,500 Est. **

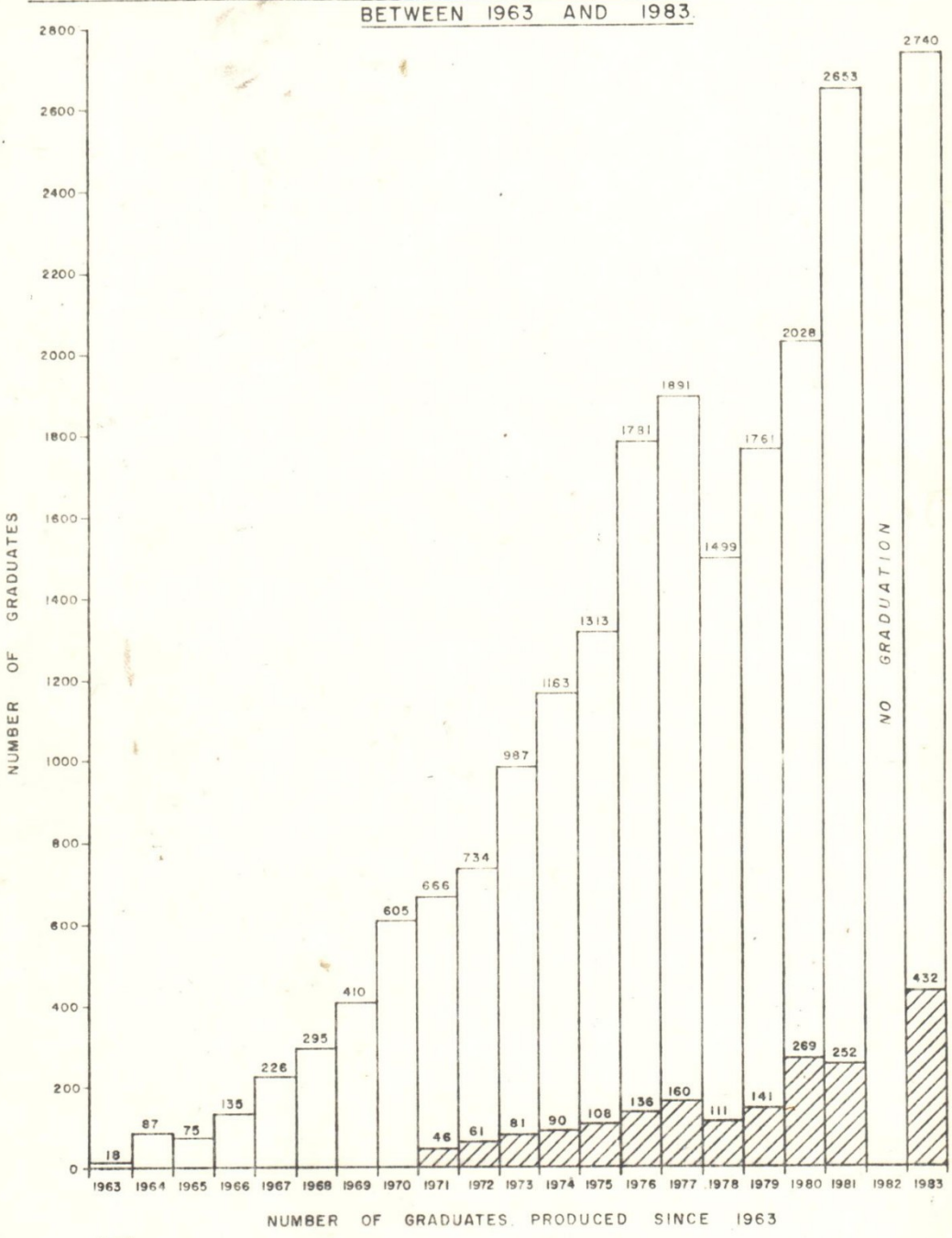
* Does not include private 'A' Level graduates and those taken from Diploma awarding institutions.

** Intake for 1985/86 will be in October, 1984.

SOURCE : University of Nairobi.

Table ix

PATTERN OF PRODUCTION OF GRADUATES BY THE UNIVERSITY OF NAIROBI BETWEEN 1963 AND 1983.



KEY

▨ .....Postgraduates (M.A., Ph Ds & Postgraduate diplomas) produced since 1971.

SOURCE : Vice Chancellor's Office.

Table x

MOI UNIVERSITY PLANNED INTAKE AND STAFF

FACULTY/SCHOOL/INSTITUTE	UNDERGRADUATE ENROLMENT		STUDENTS No.3,200. STAFF REQUIRED	STUDENTS No.5,000. STAFF REQUIRED
	NUMBERS	PERCENTAGE		
1. Faculty of Technology	1,120	35	84	105
2. Faculty of Agriculture	800	25	60	75
3. Faculty of Science	512	16	39	48
4. Faculty of Veterinary Medicine	320	10	24	30
5. Faculty of Forest Resources and Wildlife Management	192	6	15	18
6. Faculty of Social, Cultural and Development Studies	160	5	12*	15
7. Faculty of Information Sciences	96	3	8	9
8. School of Graduate Studies	-	-	-	-
9. School of Environmental Studies	-	-	-	-
10. Institute of Applied Science and Technology	-	-	-	-
TOTAL	3,200	100	242	300

SOURCE : The Second University. Report of the Presidential Working Party.

Table xi

EGERTON COLLEGE PRODUCTION.

COURSE	Level of Entry	Level of Course	Duration of Course	ANNUAL INTAKE 1980/81	1981/82	1982/83
FOR ALL COURSES						
1. General Agriculture	KCE/ KACE	Diploma	3 years	23	22	38
2. Agriculture Education				22	34	37
3. Soil and Water Engineering				20	23	21
4. Farm and Power Machinery				20	19	21
5. Animal Husbandry				37	38	45
6. Animal Health				19	21	18
7. Horticulture				24	25	38
8. Farm Management				41	35	44
9. Dairy Technology				17	18	20
10. Food Science and Technology				17	20	23
11. Range Management				23	26	40
12. Agriculture and Home Economics				21	29	22
13. Wildlife Management				10	17	17
14. Ranch Management				8	16	16
			TOTAL	402	353	400

SOURCE : Second University. Appendix 4a. Page 110.

Table xii

JOMO KENYATTA COLLEGE OF AGRICULTURE AND TECHNOLOGY PRODUCTION.

COURSE	Level of Entry	Level of Course	Duration of Course	ANNUAL INTAKE 1980/81	1981/82	1982/83
1. General Agriculture	KCE	Diploma	3 years		30	30
2. Agriculture Engineering	KCE				26	26
3. Food Processing	KCE				20	20
4. Building Civil Engineering	KCE				44	44
5. Mechanical Engineering					38	38
6. Electrical Engineering					30	30
			TOTAL		188	188

SOURCE : Second University. Appendix 4b. Page 110.

Table xiii a.

EMBU INSTITUTE OF AGRICULTURE PRODUCTION.

COURSE	Level of Entry	Level of Course	Duration of Course	ANNUAL INTAKE 1980/81	1981/82	1982/83
1. General Agriculture	KCE	Certificate	2 years	150	155	155

SOURCE : Second University. Appendix 4c. P. 110.

Table xiiib. BUKURA INSTITUTE OF AGRICULTURE PRODUCTION

	COURSE	Level of Entry	Level of Course	Duration of Course	ANNUAL INTAKE 1980/81	1981/82	1982/83
1.	General	KCE	Cert.	2 years	175	150	200

Table xiv. KENYA INSTITUTE OF MASS COMMUNICATION PRODUCTION

	COURSE	Level of Entry	Level of Course	Duration of Course	ANNUAL INTAKE 1980/81	1981/82	1982/83
1.	Senior Technician Trainee	KCE/ KACE	Cert.	2 years	89	90	90
2.	Junior Technical Operators	KCE/ KACE	Cert.	2 years	10	12	12
3.	Production Asst. T.V	KACE	Cert.	2 years	6	6	6
4.	Production Asst. Radio	KACE	Cert.	2 years	6	6	6
5.	Information Asst. Course	KACE	Cert.		15	15	1
6.	Film Production Course.						
	Camera	KACE			6	6	
	Editing	KACE			6	6	
	Sound	KACE			6	6	
	Recordists	KACE			6	6	
	Laboratory	KACE			6	6	
	Technician	KACE			6	6	
				TOTAL	150	153	115

SOURCE : Second University. Appendices 4d and 5. Pages 110 and 112.

Table xv

UTALII COLLEGE PRODUCTION

COURSE	Level of Candidate	Duration	Level of Course	YEARLY INTAKE 1980/81	1981/82	1982/83
Management	KACE	4 years	Diploma	32	32	32
Service (Food and Beverage)	KCE	2 years	Certificate	96	96	96
Front Office Operation	KCE	2 years	Certificate	40	40	40
Food Production	KCE	2 years	Certificate	30	30	30
House-Keeping and Laundry	KCE	2 years	Certificate	30	30	30
Travel Operations	KCE	2 years	Certificate	30	30	30
			TOTAL	258	258	258

SOURCE : Second University. Appendix 6. Page 113.

Table xvi

TRAINING INSTITUTIONS UNDER THE DIRECTORATE OF PERSONNEL MANAGEMENT PRODUCTION.

Institution	Course	Level of Candidate	Level of Course	YEARLY INTAKE 1980/81	1981/82	1982/83
Kenya Institute of Administration, Lower Kabete, (DPM)	1. Social work	KACE	Diploma	22	25	
	2. Probation	KACE	Diploma	20	25	
			TOTAL	42	50	50
Government Training Institute, Mombasa	1. Pre-Service Copy Typists	Mainly KCE	Certificate	30	30	
Kenya Government Secretarial College, Nairobi.	1. Pre-Service Secretarial course	KCE/KACE	Certificate	180	210	180
Matuga D.D. Centre, Kwale	1. Pre-Service Copy Typists Course.	KCE	KNE Council.	30	30	30
Police Training Centre	1. Telecom. Technicians	KCE	Certificate	9	30	30
	2. Armourers	KCE	Certificate	-	20	20
	3. Mechanics	KCE	Certificate	16	20	20
				25	70	70

SOURCE : Second University. Appendix 7. Page 114.

Table xvii

MEDICAL TRAINING PROGRAMMES PRODUCTION.

	Course	Level of Entry	Level of Course	Duration	Yearly Intake 1980/81	1981/82
1.	Clinical Officers	KCE	Diploma	3 years	140	140
2.	Environmental Health	KCE	Diploma*	3 years	30	35
3.	Medical Laboratory Technologist	KCE	Certificate*	3 years	26	30
4.	Registered Nurses	KCE	K.R.N. Certificate	4 years	200	200
5.	Pharmaceutical Technology	KCE	Diploma	3 years	35	35
6.	Physiotherapy	KCE	Diploma	3 years	35	40
7.	Occupational Therapy	KCE	Diploma	3 years	30	30
8.	Dental Technology	KCE	Diploma	3 years	7	8
9.	Orthopaedic Technology	KCE	Diploma	3 years	4	5
10.	Radiographers	KCE	Diploma	3 years	26	30
11.	Medical Records	KCE	Certificate	2 years	40	40
12.	Environmental Health Technicians	KCE	Certificate*	2 years	210	210
13.	Medical Laboratory Technicians	KCE	Certificate*	2 years	88	100
14.	Radiographic Film Processor	KCE	Certificate	2 years	25	25
15.	Enrolled Community Nurse	KCE	Certificate	3½ years	596	730
16.	Food Technology	KCE	Diploma/ Certificate*	9 months	15	15
					1,533	1,683

*Certificates/Diplomas awarded by the University of Nairobi.

SOURCE : Second University in Kenya. Table 5. Page 26.

Table xviii

APPROXIMATE NUMBERS OF KENYANS STUDYING OVERSEAS ACCORDING TO COUNTRY OF STUDY, 1981

	Country	Number	Comments
1.	U.S.A. and Canada	4,000	The number includes some who are working either on full-time or part-time basis. Most of them privately sponsored.
2.	United Kingdom	1,200	120 on full Kenya bursaries. Private registered students are 53.
3.	India	1,000	Majority on private scholarships. Seven on Indian Government Scholarships.
4.	U.S.S.R.	277	All students on USSR Government Scholarship.
5.	Rumania	34	All on Rumania's Government Scholarships.
6.	Poland	30	Sponsored by Government of Poland.
7.	Bulgaria	15	Sponsored by Government of Bulgaria.
8.	Hungary	10	Hungarian Government Scholarship.
9.	Australia	13	8 Postgraduates and 5 undergraduates. Australia Government sponsorship and one private.
10.	Greece	34	Government of Greece Scholarships.
11.	Yugoslavia	23	Yugoslavia's Government Scholarship.
12.	Czechoslovakia	3	On Czechoslovakia's Government Scholarship.
13.	Democratic Republic of Germany	3	Government of Germany Scholarships.

Table xviii

APPROXIMATE NUMBER OF KENYANS STUDYING OVERSEAS ACCORDING TO COUNTRY OF STUDY, 1981 -(Contd.)

	Country	Number	Comments
14.	Federal Republic of Germany	23	Majority on private sponsorship.
15.	France	38	Majority on Government of France Scholarships.
16.	Sweden	11	Majority on private scholarship.
17.	Denmark/Finland/ Norway	10	Privately sponsored.
18.	Egypt	26	Egyptian Government Scholarship.
19.	Iraq	25	Government of Iraq Scholarship.
20.	Sudan	15	Majority persuing Islamic Studies.
21.	Nigeria	22	Majority on scholarships offered by Inter-African Scholarship Programme (INTERAF)
22.	Ghana	6	Government of Ghana Scholarships.
23.	Zambia	3	Government of Zambia Scholarships.
24.	Cameroon	6	Privately sponsored.
25.	Pakistan	12	Privately sponsored.
26.	Phillipines	2	Privately sponsored.
27.	Japan	3	Privately sponsored.
	TOTAL	6,844	

SOURCE : Second University in Kenya. Table 2. Pages 15 and 16.

Table xix a. ENROLMENT* AT KENYA POLYTECHNIC, 1976-1982

	1976	1977	1978	1979	1980	1981/82	1982/83
Engineering Departments							
Mechanical Engineering	171	144	105	98	154	229	286
Electrical Engineering	157	199	126	171	254	248	515
Automobile Engineering	110	111	126	144	127	136	142
General Course	49	55	26	183	67	41	183
Aeronautical	-	-	-	-	11	-	-
Telecommunications	78	67	47	76	55	65	106
Building and Civil Engineering Department							
Building and Civil Engineering Courses	218	227	259	272	267	342	391
Public Health Inspector	39	-	-	-	-	-	18
Science Department							
G.C.E. "A" Level	47	66	155	200	184	182	217
Laboratory and other Technicians	140	215	287	349	388	387	568
Commerce Department							
Secretarial Courses	121	114	85	106	135	159	185
Commerce Courses	95	92	223	248	355	385	376
Professional Courses	195	226	100	220	195	273	341
Printing Section	111	102	137	162	121	125	155
Catering and Hotel Management	98	77	94	98	100	107	148
Special Courses (Library and Archives Dept.)	15	10	23	40	48	66	82
Technical Teacher Training	69	35	49	-	-	-	-
Total	1,713	1,740	1,842	2,367	2,461	2,745	3,713

Table xix b. ENROLMENT* AT MOMBASA POLYTECHNIC, 1982

Subject	YEARS					Number
	1	2	3	4	5	Total
Mechanical Engineering Technician	6	33	12	-	-	51
Fabrication Steelwork	-	-	-	-	-	1
Welder and Welding Engineering	6	-	-	-	-	6
Mechanical Engineering Craft and Practice	-	-	-	-	-	-
Mechanical Fitter and Maintenance	-	-	-	-	-	-
Motor Vehicle Technician	20	13	-	-	-	33
Electrical Engineering Technician	41	50	68	73	70	302
K.A.C.E.	29	42	-	-	-	71
Laboratory Technician	-	-	-	-	-	-
Building and Construction	114	128	-	-	-	242
Business Administration	47	18	-	-	-	65
A.C.N.C., C.P.A., C.P.S., P.S.C. and B.I.S.M.	306	-	-	-	-	306
Higher Diploma in Electrical Engineering	23	15	-	-	-	38
Higher Diploma in Mechanical Engineering	15	10	-	-	-	25
Ordinary Diploma in Science Technology	8	7	-	-	-	15
General Science Pretechnician Course	12	-	-	-	-	12
Total	627	316	80	73	70	1,166

* Full and Part-time Students.

SOURCE : Statistical Abstracts 1983. Tables 179 and 180.

Table xx

THE PROJECTED ANNUAL SUPPLY OF DIPLOMA AND GRADUATE TEACHERS

College	1984	1985	1986	1987	1988	1989	1990
Kenyatta University B.ED.	880	950	1,000	1,000	1,000	1,000	1,000
KUC. Diploma	80	100	120	140	160	180	200
KSTC	265	265	265	265	265	265	265
KTTC	200	200	200	200	200	200	200
Siriba	270	270	270	270	270	270	270
Kagumo	330	330	330	330	330	330	330
Kisii			150	200	200	200	200
Moi Teachers			40	80	290	290	290
Total	2,025	2,115	2,375	2,485	2,715	2,735	2,775

SOURCE : Ministry of Education.

Table xxi

THEORETICAL ANNUAL INTAKE IF INSTITUTIONS ARE UPGRADED. 1985 - 1988.

	Low	High
Universities	7,000	8,000
HIT's	4,200	5,000
Egerton	500	1,000
GoK. Ministries	4,000	4,000
National Polytechnics	4,000	5,000
KTTC & KSTC	400	500
Kagumo and Siriba, Kisii	600	700
Total	16,700	24,200

SOURCE : Consultant Calculations. 1984.

Table xxii a.

UNIVERSITY OF NAIROBI PRODUCTION PATTERN. 1971 - 1983

Faculty/School/ Institute	First Degrees and Diplomas	Masters Degrees and Post graduate Diplomas	Doctorate Degrees	Totals
1. Agriculture	717	202	11	930
2. Architecture, Design and Development	1,026	226	1	1,253
3. Arts	3,048	384	30	3,462
4. Commerce	1,571	63	1	1,635
5. Education	4,331	383	8	4,722
6. Engineering	1,737	63	3	1,803
7. Law	594	13	-	607
8. Medicine	1,255	192	18 + 3M.D	1,468
9. Science	1,749	269	50	2,068
10. Veterinary Medicine	762	47	15	824
11. Adult Studies	171	-	-	171
12. Journalism	127	44	-	171
TOTAL	17,088	1,886	140	19,114

Table xxii b.

KENYATTA UNIVERSITY COLLEGE PRODUCTION BY FACULTY
1977/78 - 1982/83

COURSES	1977/78	1978/79	1979/80	1980/81	1981/82	1982/83
B. Education	1,019	1,395	1,566	1,830	2,019	N/A
Dip. Education	171	10	188	346	162	"
B.Sc. (Home Economics)	-	-	-	-	-	"
B.A. (Fine Art)	-	-	-	-	19	"
Post Graduate Courses	20	148	86	102	141	"
Total	1,210	1,553	1,840	2,278	2,341	"

SOURCE : Second University. Report of the Presidential Working Party 10th, 11th and 12th Congregation Lists, and Statistical Abstracts 1983.

Table xxiii.

UNIVERSITY OF NAIROBI : COLLEGES, 1984.

1. College of Adult and Distance Education
2. College of Architecture and Engineering
3. College of Health Sciences
4. College of Humanities and Social Sciences
5. College of Physical and Biological Sciences
6. College of Agriculture and Veterinary Sciences.

Table xxiv

UNIVERSITY OF NAIROBI PRODUCTION PATTERN 1980, 1981, and 1983.

	Faculty/School/ Institute	First Degrees and Diplomas	Masters Degrees and Post graduate Diplomas	Doctorate Degrees	Totals
	1980				
1.	Agriculture	91	59	1	151
2.	Architecture, Design and Development	72	13	-	85
3.	Arts	142	50	3	195
4.	Commerce	138	4	-	142
5.	Education	574	30	2	606
6.	Engineering	161	17	2	180
7.	Law	65	2	-	67
8.	Medicine	148	30	2 + 1 M.D	181
9.	Science	150	35	7	192
10.	Veterinary Medicine	65	1	-	66
11.	Adult Studies	21	-	-	21
12.	Journalism	-	11	-	11
	Sub-total	1,627	252	18	1,897
	1981				
1.	Agriculture	120	34	-	154
2.	Architecture, Design and Development	82	16	-	98
3.	Arts	547	44	5	596
4.	Commerce	185	11	-	196
5.	Education	572	43	-	615
6.	Engineering	152	4	-	156
7.	Law	73	2	-	75
8.	Medicine	184	40	3	227
9.	Science	381	23	9	413
10.	Veterinary Medicine	89	2	1	92
11.	Adult Studies	24	-	-	24
12.	Journalism	-	14	-	14
	Sub-total	2,409	233	18	2,660

Table xxiv

UNIVERSITY OF NAIROBI PRODUCTION PATTERN 1980, 1981, and 1983 - (Contd.)

Faculty/School/ Institute	First Degrees and Diplomas	Masters Degrees and Post graduate Diplomas	Doctorate Degrees	
1983				
1. Agriculture	118	42	3	163
2. Architecture, Design and Development	90	12	-	102
3. Arts	472	55	8	535
4. Commerce	188	16	-	204
5. Education	670	132	2	804
6. Engineering	164	10	-	174
7. Law	65	3	-	68
8. Medicine	171	52	1	224
9. Science	269	80	5	354
10. Veterinary Medicine	67	17	3	87
11. Adult Studies	22	-	-	22
12. Journalism	-	19	-	19
Total	2,296	438	22	2,756
Grand Total	6,332	923	58	7,313

SOURCE : Tenth, Eleventh and Twelfth Congregation Lists.

NB. The Congregation List of names submitted for graduation vary from Table ix - Pattern of Production of Graduates by University of Nairobi between 1963 and 1983, which is the official chart given out by the Vice - Chancellor's Office.

The figures for Arts undergraduates differ.

Table xxv

NATIONAL YOUTH SERVICE

		Approved Estimates 1982/83	Approved Estimates 1983/84	Estimates 1984/85
		K£	K£	K£
Headquarters Administration Services.				
Consultants		100,000	250,000	300,000
Additional Transport (Tana River Project)		3.800,000	-	10
Furniture and Equipment		300,000	195,670	164,000
Kerio Valley Road Project		-	500,000	500,000
Construction of Buildings		400,000	400,000	300,000
Expansion of Vocational Training		-	-	250,000
Tana Basin Road Project				
Construction Equipment		-	1,200,000	1,500,000
Project Construction Costs		-	900,000	1,000,000
GROSS EXPENDITURE	K£	-	-	7,390,760
Appropriations in Aid				
Credit Purchase Vehicles - Japanese Commodity Loans and Technical Aid		3,100,000	1,200,020	4,750,000
Training Grant from Netherlands		300,000	-	250,000
Total Appropriations in Aid	K£	-	-	5,250,750
NET EXPENDITURE	K£	-	-	2,140,010
Training Units				
Nairobi.				
Furniture and Equipment		60,000	20,000	-
Minor Works		-	-	20,000
Construction of Buildings		300,000	-	200,000
Extensions and Improvements		25,000	10,000	-

Mombasa			
Construction of Buildings, Mtongwe		300,000	200,000
Nakuru			
Construction of Buildings, Naivasha		700,000	800,000
Construction of Buildings, Gilgil		800,000	1,200,000
NET EXPENDITURE	K£	-	2,420,000
Production Units			
Nairobi			
Farm Inputs		180,000	-
Furniture and Equipment		20,000	-
Nyandarua			
Construction of Buildings at Tumaini		-	12,500
Tana River District			
Bura Irrigation Scheme		100,000	200,000
Machakos			
Construction of Buildings at Yatta		150,000	100,000
South Nyanza			
Construction of Buildings at Lambwe		-	25,000
Laikipia			
Construction of Buildings at Kilimon			47,000
Kilimon Ranching Scheme		75,000	75,000
Uasin Gishu			
Construction of Buildings at Turbo		-	100,000
West Pokot			
Construction of Buildings at Lomut		-	12,500
NET EXPENDITURE	K£	-	572,000
NET TOTAL	K£	-	5,132,010

SOURCE : Development Estimates for the year 1982/83 - 1984/85.

Teble xxvi

ESTIMATED RECURRENT COST PER STUDENT
BY TYPE OF INSTITUTION, 1978/79 AND 1984/85.

K£	1978/79	1984/85
Primary School	18	30
Primary School for the handicapped	90	160
Secondary Aided School	85	150
Primary teacher training college	270	470
Harambee institutes of technology	150	260
Kenya Science Teachers College	902	1,570
Kenyatta University College	1,730	3,030
University of Nairobi	1,780	3,120

SOURCE : Economic Survey, 1979 and Ministry of Education, Science and Technology.

Table xxvii LAKE BASIN DEVELOPMENT AUTHORITY ESTIMATES. 1982/83 - 1984/85

	Approved Estimates 1982/83	Approved Estimates 1983/84	Estimates 1984/85
	K£	K£	K£
Water Catchment Conservation and River Project Studies	200,000	50,000	-
Shallow Wells Project	78,257	22,500	-
Building Materials Project	48,400	-	-
Effluent Monitoring and Control Project	20,000		20,000
Food Security Programme	300,000	-	-
Lake Basin Agricultural Project	62,000	40,000	-
Uplands Rice Project	220,000	10,000	80,000
Bee Keeping Project	122,500	7,080	20,000
Windmill Demonstration Project	40,000	8,000	-
Groundnut Project	12,000	10,000	30,000
Regional Horticultural Development	150,000	15,000	50,000
Lake Basin Agricultural Development	-	10	-
Solar Energy Project	-	10	-
Flood and Drainage Control	-	50,000	-
Fisheries Development in Lake Basin Area	-	100,000	-
Intergrated Regional Masterplan	-	-	20,000
Building Materials Manufacture		10	-
Flood Control and Drainage	-	-	100,000
Construction of Communal Wells	-	-	50,500
Pre-Development Studies	-	-	20,000
Purchase of Plant and Equipment	-	-	80,000
Yala Swamp Phase 1	-	-	100,000
Pre-Development Studies - Others	-	-	10,000
Cotton Project	-	-	100,000
Fisheries Project	-	-	100,000
Purchase of Animal - Lichota	-	-	33,000
Purchase of Animal - Muhoroni	-	-	33,000
Purchase of Animal - Sangalo	-	-	34,000

Tile and Brick Manufacture - Kisumu	-	-	10,000
Tile and Brick Manufacture - Kakamega	-	-	15,000
Tile and Brick Manufacture - Kisii	-	-	15,000
Soapstone Processing - Kisii	-	-	10
Health Surveillance	-	-	10,000
Webuye Hydro - Power Project	-	-	10
Teremi/Mau Forest Hydro-Power	-	-	10
Buildings	-	-	50,000
Housing	-	-	100,000
GROSS EXPENDITURE	K£	522,710	1,130,530
Appropriations in Aid			
Sale of Produce - Rice and Other Crops	-	-	60,000
Sale of Animals	-	-	50
Sale of Bricks	-	-	20,000
Sale of Goods and Services - Wells	-	-	25,000
Reimbursements - Cotton Project	-	-	50,000
Credit Purchase - UNDP	-	-	125,000
Credit Purchase - Netherlands	-	-	50,000
TOTAL APPROPRIATIONS IN AID	K£		330,050
NET EXPENDITURE	K£	522,710	800,480

SOURCE : Development Estimates for the year 1982/83 - 1984/85.

Table xxviii

COMMONWEALTH COUNTRIES, POP. 2000AD GNP 2000AD
FRACTION P&T/1000.

Country	Eatimated Population 2000 10^6	GNP's - 2000 A 0% Growth	B 2.5% Growth	C 5.0% Growth	Prof. & Tech. Staff/1000 A	B	C
Bangladesh	141.0	140	224	354	0.5	0.9	1.5
Ghana	22.9	470	751	1,188	2.0	3.5	6.0
India	994.1	270	432	682	1.1	1.8	3.1
Jamaica	3.3	1,100	1,759	2,780	5.5	9.6	14.9
KENYA	36.0	460	735	1,162	2.0	3.5	6.0
Lesotho	2.3	430	687	1,087	1.8	3.1	5.4
Malawi	11.9	250	400	632	1.0	1.7	2.9
Malaysia	20.8	1,900	3,037	4,801	10.5	16.0	24.6
Nigeria	168.6	1,050	1,679	2,653	5.2	9.1	1.3
Papua N.G.	4.5	800	1,279	2,022	3.8	6.7	11.2
Sierra Leone	6.2	294	470	743	1.2	2.0	3.3
Singapore	3.1	4,800	7,673	12,130	24.0	34.7	43.5
Sri Lanka	21.1	300	480	758	1.2	2.0	3.3
Tanzania	36.2	276	441	697	1.1	1.8	3.1
Trindad	1.6	4,750	7,593	12,000	2.4	34.6	43.4
Uganda	24.3	310	496	783	1.2	2.1	3.4
Zambia	11.5	533	852	1,347	2.3	4.1	6.4
Zimbabwe	17.4	717	1,146	1,812	3.2	5.8	10.0

SOURCE : A Proposal for the Developing Commonwealth. Table 2.

Table xxix

COMMONWEALTH COUNTRIES, ENGINEERS AND TECHNICIANS
NEEDED IN 2000, SCENARIOS A, B, C.

Country	Total P/T Staff			Engineers			Technicians		
	A	B	C	A	B	C	A	B	C
Bangladesh	70,500	1,126,900	211,500	10,575	19,035	31,725	42,300	76,140	126,900
Ghana	45,800	80,150	137,400	6,870	12,023	20,610	27,480	48,090	82,440
India	1,093,510	1,789,380	3,081,710	164,027	268,407	462,257	656,106	1,073,628	1,849,026
Jamaica	18,150	31,680	49,170	2,723	4,752	7,376	10,890	19,008	29,502
KENYA	72,000	126,000	216,000	10,800	18,900	32,400	43,200	75,600	129,600
Lesotho	4,140	7,130	12,420	621	1,070	1,863	2,484	4,278	7,452
Malawi	11,900	20,230	34,510	1,785	3,035	5,177	7,140	12,138	20,706
Malaysia	218,400	332,800	511,680	32,760	49,920	76,752	131,040	199,680	307,008
Nigeria	876,720	1,534,260	2,410,980	131,508	230,139	361,647	526,032	920,556	1,446,588
Papua N.G.	17,100	30,150	50,400	2,565	4,523	7,560	10,260	18,090	30,240
Sierra L.	7,440	12,400	20,460	1,116	1,860	3,069	4,464	7,440	12,276
Singapore	74,400	107,570	134,850	11,160	16,136	20,228	44,640	64,542	80,910
Sri Lanka	25,320	42,200	69,630	3,798	6,330	10,445	15,192	25,320	41,778
Tanzania	39,820	65,160	112,220	5,973	9,774	16,833	23,892	39,096	67,332
Trinidad	38,400	55,360	69,440	5,760	8,304	10,416	23,040	33,216	41,664
Uganda	29,160	51,030	82,620	4,374	7,655	12,393	17,496	30,618	49,572
Zambia	26,450	47,150	73,600	3,968	7,073	11,040	15,870	28,290	44,160
Zimbabwe	55,680	100,920	174,000	8,352	15,138	26,100	33,400	60,552	104,400

SOURCE : A Proposal for the Developing Commonwealth. Table 3

Table xxx

OUTPUT OF ENGINEERS NEEDED

Country	Estimated 1982 Stock	Needs in 2000			Average output needed 1988-2000			Present Output University	Present Output H.N.D. Polytech.
		A	B	C	A	B	C		
Bangladash	6,000	10,600	19,000	31,700	593	1,293	2,351	587	-
Ghana	1,800	6,900	12,000	20,600	425	850	1,567	159	-
India	286,000	164,000	268,000	462,000	-	938	17,104	14,000	-
Jamaica	-	2,700	2,700	4,800	7,400	-	-	-	-
KENYA	1,500	10,800	18,900	32,400	775	1,450	2,575	151	190 ?
Lesotho	-	620	1,100	1,900	-	-	-	-	-
Malawi	-	1,800	3,000	5,200	-	-	-	-	-
Malaysia	3,000	32,800	50,000	77,000	2,233	3,917	6,167	229	-
Nigeria	9,000	131,500	230,000	362,000	10,523	18,731	29,731	1,210	1,100 ?
Papua N.G.	200	2,600	4,500	7,600	200	358	617	72	-
Sierra Leone	100	1,100	1,900	3,100	83	150	250	30	-
Singapore	5,000	11,200	16,100	20,000	517	925	1,250	450	150 ?
Sri Lanka	3,000	3,800	6,300	10,400	172	380	822	237	-
Tanzania	1,900	6,000	9,800	16,800	342	658	1,242	91	-
Trinidad	3,000	5,800	8,300	10,400	233	442	617	100	-
Uganda	1,200	4,400	7,700	12,400	267	542	933	42	-
Zambia	1,800	4,000	7,100	11,000	183	442	767	73	-
Zimbabwe	800	8,400	15,100	26,100	633	1,192	2,108	18	-

SOURCE : A Proposal for the Developing Commonwealth. Table 4.

Table xxxi

OUTPUT OF TECHNICIANS NEEDED

Country	Estimated 1982 Stock	Needs in 2000			Average out put needed 1988-2000			Present Output Polytech. O.N.D.
		A	B	C	A	B	C	
Bangladesh	9,000	42,300	76,140	126,900	2,561	5,165	9,069	1,500
Ghana	8,100	27,480	48,090	82,440	1,490	3,076	5,718	300
India	449,000	656,106	1,072,628	1,849,026	15,931	48,048	107,692	-
Jamaica	-	10,890	19,008	29,502	-	-	-	120
KENYA	2,000	43,200	75,600	129,600	3,169	5,662	9,815	510
Lesotho	-	2,484	4,278	7,452	-	-	-	-
Malawi	-	7,140	12,138	20,706	-	-	-	-
Malaysia	4,000	131,040	199,680	307,008	-	-	-	-
Nigeria	15,000	526,032	920,556	1,446,688	39.310	69,658	110,122	4,000
Papua N.G.	-	10,260	18,090	30,240	-	-	-	-
Siarra Leone	-	4,464	7,440	12,276	-	-	-	-
Singapore	-	44,640	64,542	80,910	-	-	-	-
Sri Lanka	11,400	15,192	25,320	41,778	292	1,071	2,337	-
Tanzania	3,900	23,892	39,096	67,332	1,538	2,707	4,879	300
Trinidad	-	23,040	33,216	41,664	-	-	-	-
Uganda	2,000	17,496	30,618	49,572	1,192	2,201	3,813	-
Zambia	2,500	15,870	28,290	44,160	1,028	1,984	3,205	300
Zimbabwe	400	33,400	60,552	104,400	2,538	6,015	8,000	350

SOURCE : A Proposal for the Developing Commonwealth. Table 5.

Table xxxii QUALIFICATION OF PRIMARY SCHOOL TEACHERS (1964 - 1975)
QUALIFIED TEACHERS ONLY.

Year	Graduates	SI	PI	P2	P3	P4	Other	Total
1964	80	290	1560 (8%)	2540 (13%)	11780 (61%)	2670 (14%)	250	19,180
1965	90	280	1480 (7%)	2900 (14%)	12400 (62%)	2540 (13)	420	20,110
1966	90	290	1620 (7%)	3270 (14%)	14760 (63%)	2880 (12%)	390	23,310
1967	80	310	1680 (7%)	3800 (15%)	16030 (64%)	2820 (11%)	330	25,050
1968	80	310	1800 (7%)	5320 (19%)	16990 (62%)	2700 (10%)	290	27,490
1969	70	330	2210 (7%)	6640 (22%)	17860 (60%)	2700 (9%)	180	30,000
1970	60	290	2990 (9%)	8480 (26%)	18420 (65%)	2460 (7%)	240	32,930
1971	70	340	4060 (11%)	10230 (27%)	20160 (54%)	2420 (6%)	340	37,620
1972	30	330	5480 (13%)	12740 (31%)	20500 (49%)	2320 (6%)	200	41 600
1973	50	510	6290 (14%)	13820 (31%)	20710 (47%)	2390 (5%)	160	43,930
1974	40	610	7520 (16%)	15070 (47%)	22600 (47%)	2090 (4%)	30	47,960
1975	90	1220	13050 (24%)	20390 (37%)	17900 (33%)	2010 (4%)	170	54,820

SOURCE : NCEOP - 1976 : 116 Cited in"The Evolution of Higher Education in Kenya. Shem Mighot Adhola, (Mimeo) 1983.

Note : For most years nos. of teachers are calculated for the month of March. Some newly qualified teachers enter schools in mid-year.

Table xxxiii

QUALIFICATION OF TEACHERS IN PRIMARY AND SECONDARY SCHOOLS
1976 - 1982

Primary

TRAINED	1976	1977	1978	1979	1980	1981 **	1982 **
Graduate	50	47	-	109	145	98	5
Approved *	-	-	-	-	-	-	131
SI	1456	1163	2436	2619	2642	2834	2712
PI	13649	16466	19224	22813	24708	26196	31375
P2	21764	22572	23638	25631	26697	27278	28278
P3	16869	16200	15376	15612	15547	15982	16505
P4	1871	1687	1557	1483	1449	1102	828
Other	486	424	-	125	839	-	830
Total	56145	58559	64101	68392	72029	73499	80664
UN-TRAINED							
Graduate	32	10	24	29	29	-	-
EAACE	607	541	573	519	578	773	557
EACE	19621	18706	17865	14721	20839	25839	23807
KJSE	9755	8337	7791	6507	7663	8940	8147
CPE	2706	2352	2022	1294	571	1624	1563
Other	208	151	125	1374	227	236	356
Total	32929	30097	28400	24444	30460	37412	34430

Table xxxiii contd.

Secondary

TRAINED	1976	1977	1978	1979 **	1980	1981 **	1982 +
Graduate	2129	2634	3204	3867	3186	3579	3693
Approved*	628	626	714	320	417	379	410
SI	2710	2471	2752	2896	3037	2545	2994
PI	222	226	244	302	353	368	293
P2	-	-	-	-	-	247	116
P3	-	-	-	-	-	-	-
P4	-	-	-	-	-	-	-
Other	771	757	811	352	561	784	771
Total	6460	6714	7725	7737	7554	7902	8277
UN-TRAINED							
Graduate	531	559	487	782	1824	1951	2150
EAACE	2538	3389	4185	4545	4961	5846	6457
EACE	1574	1647	1944	1796	1166	961	366
KJSE	-	-	-	-	-	-	-
CPE	-	-	-	-	-	-	-
Other	335	372	322	174	139	417	598
Total	4978	5967	6938	7297	8090	9175	9571

SOURCE : Economic Surveys, 1978 and 1980. Cited in The Evolution of Higher Education in Kenya. Shem Mighot Adhola. (Mimeo) 1983.

* An approved teacher - has completed the equivalent of a University Education.

** Estimated + Actual from head count.

Table xxxiv

CITIZEN/NON-CITIZEN TEACHERS 1976 - 1979.

	Primary				Secondary			
	1976	1977	1978	1979	1976	1977	1978	1979**
Citizens	88079	88766	91539	92297	8345	9686	11702	12635
Non-Citizens	995	890	782	530	3093	2995	2964	2399
Total	89074	89656	92321	92827	11438	12681	146631	15034

SOURCE : Economic Surveys, 1978, 1979 and 1980. Cited in The Evolution of Higher Education in Kenya. Shem Mighot - Adhola. (Mimeo) 1983.

** Estimated

Table xxxv.

SCHOOLS AND TEACHERS. 1974 - 1985.

Schools	1974	1975	1976	1977	1978	1979	1980	1981	1982[x]	1985[xx]
Primary	7,706	8,161	8,544	8,896	9,349	9,622	10,255	10,817	11,497	N/A
Secondary	1,019	1,160	1,268	1,473	1,773	1,721	1,785	1,904	2,131	"
Teacher Training	18	18	19	19	20	20	20	20	21	"
Technical (Secondary Schools)	10	10	13	13	15	16	18	18	18	"
Total	8,753	9,349	9,843	10,401	11,157	11,379	11,978	12,759	13,667	"
Teachers										
Primary Schools										
Trained Teachers	52,132	54,823	56,145	59,640	63,912	68,361	72,029	73,499	80,664	25,465
Untrained Teachers	26,208	31,284	32,929	30,124	28,134	24,401	30,460	37,412	34,430	
Secondary Schools										
Trained Teachers	-	-	6,460	6,727	7,399	7,565	8,229	8,916	8,277	14,266
Untrained Teachers	-	-	4,978	5,969	6,887	7,336	7,687	8,110	8,571	
Teacher Training Colleges										
Trained Teachers	671	601	639	661	683	692	732	694	720	863
Technical Sec. Schools										
Trained Teachers	-	-	-	-	329	343	390	276	343	N/A
Untrained Teachers	-	-	-	-	51	60	43	133	192	
Total	79,011	85,708	101,151	103,130	107,395	108,758	119,450	129,040	133,197	40,594

x Provisional xx Estimated Extra Requirement. SOURCE : Statistical Abstract 1983 and Second University in Kenya. Report.

Table xxxvi.

EMPLOYMENT IN SUGAR PRODUCING ESTABLISHMENTS BY OCCUPATION AS AT MARCH, 1980

PROFESSIONALS

CODE	OCCUPATION	NO. OF WORKERS
11 - 15	Surveyors	2
11 - 31	Electrical Engineers	3
11 - 41	Mechanical Engineers	76
12 - 11	Medical Doctors	4
13 - 10	Chemists	7
13 - 50	Agronomists	8
15 - 38	Computer Programmers	1
	TOTAL	101 (0.6%)
22 - 10	General Managers	12
22 - 51	Personnel Managers	4
22 - 52	Personnel Officers	8
22 - 70	Production, Operations, Works Managers	24
22 - 80	Marketing, Sales Managers,	1
22 - 90	Other Managers, Administrators	60
23 - 11	Accountants, Auditors	21
51 - 22	Farm Managers	51
	TOTAL	181 (1.2%)

TECHNICIANS

11 - 32	Electrical Technicians/Draughtsmen	53
11 - 42	Mechanical Technicians/Draughtsmen	80
11 - 92	Other Engineering Technicians/ Draughtsmen	12
12 - 12	Medical/Clinical Assistants	5
13 - 60	Physical or Life Science Technicians	4
	TOTAL	154 (0.9)

CODE	OCCUPATION	NO. OF WORKERS
	SUPERVISORS	
24 - 10	Clerical Services Supervisors	128
25 - 90	Other transport supervisors	1
30 - 31	Sales Supervisors	2
41 - 10	Protective service supervisors	14
51 - 23	Farm/Field Assistants	400
51 - 24	Farm supervisors	246
51 - 25	Leading hand (farming/chargehands)	28
61 - 14	Shift foremen/supervisors (food & beverage industry)	123
61 - 16	Shift foremen/supervisors (mechanical industry)	63
61 - 20	Section foremen/supervisor (mechanical industry	12
68 - 11	Leading hand (food industry and beverage	6
72 - 10	Leading hand (Engine maintenance)	8
82 - 11	Supervisors/foremen (Loading & Storage)	11
	T O T A L	1042 (6.8%)
	SKILLED WORKERS, OPERATORS, CLERKS	
12 - 52	Nurses	20
16 - 30	Primary Education Teachers/Instructors	6
16 - 40	Pre - Primary Education Teachers/ Instructors	2
23 - 12	Accounts clerks	2
23 - 90	Book - keepers or cashiers	4
24 - 21	Records keepers, stores clerks	223
24 - 22	General Office clerks	459
24 - 40	Stenographers/Secretaries	4
24 - 51	Typists	13
24 - 90	Other office machine operators	129
26 - 23	Telephone switchboard operators	7
68 - 23	Sugar refinery workers	668
72 - 20	Automobile mechanics	589
72 - 50	Heavy machinery mechanics	372

CODE	OCCUPATION	NO. OF WORKERS
73 - 21	Electrical fitters, assemblers	3
77 - 90	Other construction workers	85
78 - 11	Boiler operators	106
78 - 12	Stationery diesel engine operators	178
83 - 33	Lorry Drivers	18
78 - 21	Turbine operators	92
83 - 39	Other car drivers	523
	TOTAL	3503 (22.7%)
	SEMI - SKILLED	
68 - 29	Other sugar processers	36
69 - 90	Other wood workers	1
72 - 90	Other engine maintenance workers	538
77 - 90	Other construction workers	450
83 - 19	Other loading machine operators	52
	TOTAL	1077 (7.0%)
	UNSKILLED OCCUPATIONS	
41 - 31	Security Guards	8
41 - 32	Watchmen	78
49 - 30	Office messengers	484
51 - 26	Crop cutters	845
51 - 29	Other farm labourers	5759
68 - 90	Other food (sugar) workers	1691
91 - 00	General labourers	518
	TOTAL	9383 (60.8%)

SOURCE : Ministry of Labour Report on the Sugar Industry Manpower Survey. August, 1981. Appendix 1. Pages 114,115 and 116.

EMPLOYMENT IN SUGAR INDUSTRY BY EDUCATIONAL ATTAINMENT.
(as at 1980 March.)

Table xxxvii

	GRADUATES						NON - GRADUATES					
SUGAR COMPANY	MANAGEMENT	ENGINEERING	SCIENCE	ARTS	OTHER	SUB-TOTAL	DIPLOMA HOLDINGS	RAFT TRAINED	HIGH SCHOOL	OTHER	SUB-TOTAL	TOTAL
SONY	12	1	9	2	-	24	26	65	154	715	960	984
MUHORONI	12	1	16	3	-	32	13	170	131	1,061	1,375	1,407
CHEMELIL	2	14	13	4	-	33	33	247	180	1,076	1,536	1,569
MIWANI	3	7	10	4	3	27	14	356	116	1,358	1,844	1,871
MUMIAS	-	12	21	5	1	39	31	619	200	3,158	4,008	4,047
NZOIA	2	4	12	4	-	22	35	186	195	1,889	2,305	2,327
KABRAS	-	-	-	-	-	-	5	2	5	150	162	162
RAMISI	1	2	10	-	3	16	7	71	138	2,601	2,817	2,833
AGROINVEST	-	1	-	-	-	1	3	16	8	202	229	230
TOTAL	32	42	91	22	7	194	167	1,732	1,127	12,210	15,236	15,430
NUMBER PER 10,000 WORKERS *	21	27	59	14	5	126	108	1,122	730	7,913	9,874	10,000

SOURCE : Ministry of Labour Report on the Sugar Industry Manpower Survey. August, 1981. Table 11. Page 27.