

1.2. Departmental Activities

Three staff members are currently conducting 6 research projects in the department, three of them funded by JKUAT and the other three by JICA. Last year the department organized several seminars where members of staff and the three Japanese short-term experts presented papers. Staff and students also presented papers at the KIFST Conference held in November at the Serena Hotel, Nairobi. The department encourages participation in seminars and conferences which are fora for the exchange of ideas and dissemination of research findings. Members of staff also produced several publications in refereed journals and in Proceedings.

The department undertakes the following activities annually:

1. Open Day in October
2. KIFST Conference in November
3. Third Country Group Training Program in "Applied Food Analysis" in February to March
4. Monthly Departmental Seminars
5. Departmental Publications, Proceedings, Departmental Journal and Reports.

1.3 Technical Staff

There are 11 technicians already posted in the department and this includes 6 JKUAT graduates. The department will recruit more technicians as need arises. The department urgently needs a senior technician in the Food Processing workshop. The technicians in post support both teaching, research and production programs sufficiently. Three of the technicians have had counter-part training in Japan. Since the department emphasizes research, there is need to train more technicians who can help in such activities, through counter-part training program. Currently the department has registered one technician in its B.Sc. program in Food Technology.

Those who have been trained further need to be evaluated on their performance and be considered for promotion.

2. STUDENTS AND EXAMINATIONS

B. Sc. Programme

Progress

Since september 1993, the department has been offering two options in Food Technology and Postharvest Technology at B. Sc. Level. The second batch of B.Sc. students admitted in 1991/92 academic year completed the 4th year of study at the end of 1995/96 academic year. The 4th year students are currently conducting individual special research projects under the supervision of academic staff members in the department. The department also supports the annual JICA/JKUAT supported KIFST Conference with the general theme "Food Science and Technology for Development", with special reference to Kenya. Staff members and students are encouraged to present their

research findings at the conference and they have been actively involved in the organization and running of the conference.

Student intake has remained more or less steady at 20-25 students in the B.Sc. program. This has been encouraging because the departments finds the numbers manageable with the current level of space, staffing and laboratory facilities. Recruitment of graduates is also encouraging, with a good number of graduates getting employment in the various food industries in the country. The department has established good linkages with industries with a view of marketing our graduates. The pass rate for students has, on average, ranged from 72-100% since 1990/91.

Problems

With regard to teaching materials, the main constraint has been in their procurement. It often takes too long to obtain teaching materials and this adversely affects the administration of practicals and even teaching in general. Student research projects, both at the B.Sc. and diploma levels, are also affected by such delays. Another constraint in the teaching area is that of the lack of teaching staff. The department, therefore, has to depend on part-time lecturers, some of which will be required during the second semester. It is not unusual in the department for lecturers to teach more than 2 units in a semester.

3. B.Sc. Syllabus Revision

The department has completed its syllabus review the completion of the first group of B.Sc. in 1994, and a number of units have been harmonized with departments within the faculty of Agriculture as well as with other departments outside the faculty. The purpose of the exercise is to solve the following problems:

- i. very high teaching loads,
- ii. lack of coordination of similar subjects with other departments, (iii) less practicals / project hours provided,
- iv. lack of classrooms and limited facilities and teaching staff.

To solve these problems, the following things need to be done:

- i. increasing core units and reducing optional units,
- ii. harmonization of similar units across the departments and the faculties, and
- iii. introduction of practical units and increasing project units.

4. Production Unit

Since the workshops started operating at full scale, the students have benefited from practical working experience under busy large

scale production. The four workshops are fully operational in the areas of baking, fruits & vegetables processing, meat and dairy processing. The total profit from sales of products produced in the workshop in the last six years (1990/91 - 1994/95) has reached K.Sh. 2,088,446/=.

For the workshop to function effectively, the department should have some control over the management of the profits accruing from sales of products. To facilitate the procurement of raw materials and equipment maintenance, profits should be ploughed back to the workshop. This will avoid delays in procurement, repairs, etc. and increase productivity.

The department also requires replacement and repair of out-dated equipment in the food processing Workshops.

5. Facilities and Equipment

The new laboratories were provided through Japanese grant aid and these need to be equipped with basic laboratory equipment for carrying out research by academic staff members as well as student projects. The provision of such equipment is currently in progress, however, the syllabus requires more equipment and faster provision of equipment than is currently the case. Equipment in the old laboratories such as the Chemistry and Microbiology-1 need to be either replaced or repaired.

III. DEPARTMENT OF HORTICULTURE

1. STAFF ACTIVITIES

(a) Research

During the period April 1990 to March 1996, the department, undertook 22 research projects. Twelve of these projects have been funded by JICA. The remaining research projects were funded by DAAD (2), JKUAT (1), Supafoam (2), Farmchem (1), FAO (1), World Bank (1) USAID (1) and departmental assistance (1). Ninety of these projects have been concluded. One project got terminated while two are on-going. There are several student research projects conducted so far in the department. Each student conducts a supervised research project in the final year of study.

(b) Publications

A total of 22 publications were presented and accepted in either local or international journals or seminar/workshop/ conferences with greater emphasis for increased technological impact on horticultural development and growth.

(c) Participation in Seminars, Conferences & Workshops

Members of staff in the department have continued to participate in seminars/conferences both locally and abroad. Funding for these seminars/conferences have been received from JICA, Kenyan government and other various organizations. The department also organized a successful seminar on meeting the national seed and planting materials needs of Kenya Agriculture for the year 2000 and several departmental seminars.

2. STUDENTS AND EXAMINATIONS

(a) Students Intake

The number of students admitted to the Bachelor of Science degree in Horticulture programme are summarized here below:-

1990	-	39
1991	-	closed
1992	-	41
1993	-	40
1994	-	41
1995	-	41
1996	-	39

(b) Examinations

The performance of students during the period was generally good. Pass rates were as follows:-

1990 - 93%	1993 - 80%
1991 - closed	1994 - 99%
1992 - 85%	1995 - 98%

3. CONSOLIDATION OF UNIVERSITY EDUCATION & RESEARCH

(a) Staff Recruitment

In the year 1990, eight members of staff joined the department while in 1991 one member of staff was elevated to the rank of Senior Lecturer. In 1992 two Assistant Lecturers and one Teaching Assistant joined the department. In 1993 one Lecturer and one Teaching Assistant joined the department. The department has further recruited two Teaching Assistant in 1996. Eight staff members went on study leave, out of which one has successfully joined the department having obtained Ph.D. Two staff resigned and one passed away.

(b) Equipment

For the period 1990 - 96 the department continued to receive various types of equipment and benefitted from JICA on the construction of laboratories and research facilities for both staff and students. Some of the major installations provided include a modern weather station and lath houses.

(c) Stabilization of Staff recruitment

Only one academic staff left, that is, the retention ability of staff in the department is very high.

(d) Teaching Load

Initially the department depended much on the Kenyan part-time teaching staff. However, there is a shift towards utilization of more and more of the full time staff. Average teaching load varies, however, it is compared at 2.5 units per lecturer.

(e) Syllabus

There was a syllabus review for the B.Sc. programmes with several harmonization on the courses for more effective and less expensive teaching.

(f) Library Books and Periodicals

There is departmental reference room with horticultural journals and books. However, there is need to increase on the volumes of the periodicals and journals as well as collections of book numbers.

(g) Seminars, Workshops and Conferences

Apart from participation in national and international seminars/conferences the department holds regular seminars where members of staff and students discuss topical issues. The department also invites regularly guest speakers.

(h) Staff who left for further studies

P. O. Obara	-	Ph.D (Plant Breeding)
E. N. Murage	-	Ph.D. (Olericulture)
C. K. Ndungu	-	Ph.D. (Pomology)
S. G. Agong	-	Ph.D. (Plant Breeding - completed)
F. Rimberia	-	M.Sc. (Pomology)
P. W. Masinde	-	M.Sc. (Olericulture)
J. W. Kariuki	-	Ph.D. (Floriculture)
J. B. Njoroge	-	M.Sc./Ph.D - (Landscape Management)
K. Ngamau	-	Ph.D. (Floriculture)

4. ADMINISTRATION AND MANAGEMENT OF THE DEPARTMENT

The department enjoys a well co-ordinated management and has good relationship with the University administration and Japanese experts in the Faculty of Agriculture.

5. REMARKS

The following highlights requires particular attention:-

- 1) Increased staff recruitment at lecturer and above levels.
- 2) Increased training for Ph.D. programmes both local and abroad.
- 3) The department strongly feels that the co-operation between JKUAT and JICA be extended.
- 4) The department requests for funding of more research projects and for establishing research units; pomology, olericulture, floriculture, crop protection, plant breeding and plant nutrition.
- 5) Further request is made for good and standard equipment to be brought so as to strengthen the research fundings.

FACULTY OF ENGINEERING

I. DEPARTMENT OF ARCHITECTURE

1.0 Preamble:

The department of Architecture has just completed its fifth year in the Academic Year 1995/96 and is currently completing its first cycle during this Academic year 1996/97. During the last five (5) years the Department has concentrated in the consolidation of its programmes. Today there are a total of (23) local staff and (2) Japanese counterpart staff with qualifications ranging from Assistant Lecturer to Associate Professors. We are however lacking in the crucial area of Senior Lecturers and we have embarked on a serious training programme to ensure that at least one staff member completes his Ph.D programme in the next three years for every year thereafter. The department hosted the Commonwealth Association of Architects CAA schools visitation team in 1995 and obtained part I recognition; the Part II Final Recognition will be done in October 1997.

2.0 Staff Activities:

2.1 RESEARCH

The department has continued to encourage staff members to carry out research work and to include both technical staff and students in their team. During the Academic Year 1995/96 three (3) researches were carried out and involved a total of twelve (12) staff members and Four (4) technicians. Four researches are going on during this Academic Year 1996/97 out of which two are continuing from the previous year while two are new researches. A total of twelve (12) staff members and Four (4) technicians are involved with the researches. These researches are in various fields including Traditional Architecture, Urban Environment, Urban Design & Conservation as well as the crucial area of Building Environment Science.

Due to the peculiar nature of the researches in Architecture where extensive long distance travels are common for data collection, the present policy for research funding by JICA may need review to accommodate the appropriate ration of transport and lodging in the overall budgetary expenditure. It is however worth noting that researches are yet to be adequately encouraged through some remunerations to researchers. A form of honorarium to researchers will give this extra encouragement.

2.2 SEMINARS

The Department has got an annual programme of two (2) seminar/workshop and one (1) exhibition each Academic Year. One of the seminars is usually local i.e organized at JKUAT but open to participants from within the country, while the second is

international. In between these two main seminars the department organizes workshops and individual seminars where staff members present their research findings or papers open to both staff and students.

We are glad to report that both the local and international seminars for the Academic Year 1995/96 were very successful and the international seminar attracting participants from a total of 12 countries both from Africa and Europe. While JICA remains the main sponsor of these activities, the international seminars have been executed in collaboration with the industry. Once again a form of honorarium to staff presenting papers at seminars would give encouragement to members to continue with this much involving exercise.

2.3 PUBLICATION

To further encourage Research and Seminars the Department is scheduled to launch the maiden issue of its referred Journal "The Horizon DAT" - 'Towards a Developed Architectural Traditions' during the international seminar scheduled for 25th - 26th July 1996. The Journal material is ready and the referees comprises internationally recognized scholars from Africa, Europe and the United States of America.

We believe the launching of the journal will enable the staff from this department and other departments of architecture in the region to public their research findings. It will also go along way in ensuring staff development.

3.0 STUDENTS & EXAMINATIONS

3.1 Student Intake

Student intake was kept at the optimum class size as indicated in the table below.

	M	F	TOTAL
1st Year	16	4	19
2nd Year	15	3	18
3rd Year	14	3	17
4th Year	18	2	20
5th Year	17	1	18
6th Year	18	1	19
TOTAL	97	14	111

2.4 EXAMINATIONS

The average pass rate at first sitting has continued to be high at 90%.

4.0 CONSOLIDATION OF UNIVERSITY EDUCATION & RESEARCH

4.1 STAFF RECRUITMENT

No new staff member has been recruited since 1995 except for Technical staff where one Technician was recruited. The department however saw two Senior Lecturers get promoted to Associate Professors while two Assistant Lecturers moved to Lecturer positions. The Department's goal is now to see more staff attain their Ph.D. and get promoted to the Senior Lecturer positions which are currently vacant.

4.2 PHYSICAL FACILITIES

The department was allocated counterpart development fund which will go a long way in improving the status of physical facilities. The Funding was however not adequate and the construction of specialized laboratories will still be needed.

4.3 EQUIPMENT

Although the department has continued to receive equipment more specialized equipment will be needed for the completion of the required laboratories.

4.4 STABILIZATION OF STAFF RECRUITED

During this Academic Year two staff members left the Department - one to the private practice while the other to join Nairobi University. It was noted however that the one to Nairobi University was on request from the University to alleviate their present staffing problem. Also one Technical staff resigned to join private practice. Staff will need to be continually motivated through promotions and other income generating incentives which the department ought to give due consideration.

4.5 TEACHING LOAD

With the phasing out of the Diploma programme the teaching load is now at an average of 12 - 15 Hours per week. It is however noted that due to the one-to-one teaching method for architecture the lecturers will find themselves heavily loaded.

4.6 PREPARATION OF SYLLABUS

The syllabus has been fully reviewed and is currently under discussion in the department. It is hoped that the new syllabus will be approved for implementation in the Academic Year 1997/98.

4.7 PROGRAMME GROWTH

The department is presently preparing the syllabus for Masters in Urban Design Programme. To enable the commencement of this programme the department has identified a number of staff to undertake their Ph.D programme in this area and is vigorously looking for Training opportunities for them. Additional teaching facilities will also be required. It is envisaged that this programme should be in position within the next three years.

4.8 STAFF/STUDENT RATIO

With the phasing out of the diploma programme the current staff student ration is 1:8. This is however inclusive of those staff currently on Training.

4.9 STAFF TRAINING

During the period 1995/96 to date two staff members have completed their masters Programme while two technicians have received their Certificates.

NAME	AREA OF STUDY	QUALIFI - CATIONS	SPONSOR
1. B. M. Otoki	Building Management	M.A.	JICA - Local
2. D. A. Okumu (Ms)	Human Settlements	M.Arch	Belgium Government

5.0 CONCLUSION

The next phase of the department's development should focus mainly on:

- 5.1 Development of staff through training mainly at the Ph.D level.
- 5.2 Development of reference and library materials both books and journals to enable serious research works.

- 5.3 Establishment of specialized units in areas like Building Environmental Design with a view to creating centre of excellence in the region.
- 5.4 Promotion of Research and Seminars not only within the country but also to enable members present papers at international seminars.
- 5.5 To assist students in carrying out researches particularly in the 4th and 5th years to enable them appreciate the technological bias of the programme. This will however require that all the laboratories necessary for this approach are in position and well equipped.

II. CIVIL ENGINEERING

1. Staff Activities

(a) Research

Various Research Projects have been carried by staff members.

Some of these have been joint research with members of other departments mainly Agricultural Engineering. These research activities have been funded by JICA and the University. Eleven (11) research activities were completed in 1995. The following are the research proposals in the department to be funded by JICA and the University:-

- i) Urban Waste Management, Case study - Nairobi.
- ii) Properties of Aggregate and their influence on the Strength of Structural Concrete.
- iii) Development of Preliminary Design Functions for Rural Water Supply Projects in Kenya.
- iv) Treatment of Wastes from Coffee Industry by Anaerobic Fixed Bed Filters using locally available materials.
- v) Cost Effective Repair Methods for Reinforced Concrete Structures.
- vi) Construction Plant Structure in Kenyan Construction Industry.

The department has also since 1990 up to date organized thirteen (13) departmental seminars.

Staff members have identifies thirteen (13) areas in which further research should be undertaken in the following fields:-

- i) Transportation Engineering and Urban Planning.
- ii) Water Resources Engineering.
- iii) Structures and Foundation Engineering/Materials.
- iv) Highway Engineering.

(b) Publications

From 1990 up to date, staff members in the department have made a total of 30 publications. Over the same period of 40 papers have been presented by staff members at various seminars.

2. Students and Examinations

a) Student Intake

Admission capacity for the course has not been maintained in the class size has been 28, students whereas the planned capacity is 30 students. Out of the 28 students admitted during 1990/91 academic year, 24 of them have proceeded to their fourth year of study. All these students passed and proceeded to the 5th year of study and passed their final year examination.

In total, the department has 128 degree students from 1st to 5th Year. The distribution of degree students from 1st to 5th years of study is as follows:-

B.Sc. 1st Year	28
B.Sc. 2nd Year	27
B.Sc. 3rd Year	27
B.Sc. 4th Year	23
B.Sc. 5th Year	23

b) Examinations

Examinations are administered once every semester, making a total of two times per academic year. The pass rate over the years has been more than 90%.

3. Consolidation of University Education and Research

a) Staff Recruitment

Since 1990 up to date, the following cadres of staff have been recruited:-

1990	Lecturer	11
	Assistant Lecturer	1
	Teaching Assistant	1
1992	Associate Professor	1
	Assistant Lecturer	5
	Teaching Assistant	1
1993	Professor	1
	Lecturer	1
	Assistant Lecturer	1
	Teaching Assistant	2
1994	Lecturer	1
	Assistant Lecturer	1
	Teaching Assistant	1
1995	Assistant Lecturer	1
	Senior Technician	1

To consolidate the programme, there is urgent need to recruit staff at Professor, Senior Lecturer and Lecturer levels.

b) Equipment

The department has received substantial number of specialized machinery and equipment between 1990 and 1995 as depicted on page 20 of the evaluation report.

c) Stabilization of Staff Recruited

Staff retention after recruitment is high in that between 1990/91 up to 1994/95, only 3 staff members have left the University. Internal promotion of staff to Lecturer, Senior Lecturer, Associate Professor and Professor levels within the department will enhance job motivation and therefore, play a great role in staff stabilization. There are four (4) staff members with Ph.D Degrees and these should fill most of the vacant senior positions.

d) Teaching Load

With substantial unfilled positions at Senior Lecturer level, the Department's teaching load is heavy. This overloading can be solved by further recruitment of staff at the said levels and other levels.

e) Preparation of Syllabus

Preparation of the Syllabus up to the final year is complete.

f) Seminars, Conferences, Workshops Organized

The Department over the period has organized fourteen (14) seminars held at the University in which issues relevant to national and departmental development have been discussed. These have been funded through JICA. Currently, the Department has organized seven (7) research projects which are not JICA funded.

In 1995, the Department launched the Journal of Civil Engineering, JKUAT, at a well attended seminar.

g) Staff and Student Ratio

The Department Staff Student Ratio is 1:12. This is when both Degree and Diploma students are put into consideration.

h) Staff Who Left For Further Studies

The following staff members are on study leave and are pursuing courses in the following areas and levels:-

<u>Name:</u>	<u>Area of Study:</u>	<u>Level of Study</u>	<u>Sponsor</u>
John M Kinuthia	Highway and Traffic Eng.	Ph.D, UK	Commonwealth
Moses K Gachari	Geodesy/Survey	Ph.D, UK	Commonwealth
Abiero-Gariy Z C	Water Resources Engineering	Ph.D, Germany	DAAD
M O Nyadawa	Water Resources Engineering	M.Sc., Japan	JICA
George K Simba	Construction Technology	Ph.D, SA	University of CapeTown & JKUAT
Walter O Oyawa	Structures	Ph.D, Japan	JICA
A S Monda	Structures	M.Sc., Japan	JICA
N O Ambassah	Geotechnical Eng.	M.Sc., Japan	JICA
V Muhandiki	Water Resources Engineering	M.Sc., Japan	JICA

These staff members are expected back to the Department as soon as they complete their studies. They will therefore assist in consolidating the academic programmes.

i) Teaching Load

Currently, there is teaching overloading on the part of the staff members. So that staff members can be effective in their teaching and research activities, it is important that overloading should be reduced. One way of doing these would be phasing out the Diploma Programme offered in the Department or through recruiting additional staff members to fill the vacant positions. The latter would be a more rational approach to the solution of the said problem.

j) Administration and Management of the Department

To ensure effective running of the Department, there is need to recruit competent secretary who is computer literate. Office furniture is also needed. Otherwise, there are no major bottlenecks to the running of the Department.

III. ELECTRICAL AND ELECTRONIC ENGINEERING

1. STAFF ACTIVITIES

(a) Research

Since 1990 to date , five research projects have been carried out and concluded. These are in the following areas:-

- (i) study of metal/semi conductor contacts
- (ii) computer aided control engineering education I
- (iii) study of metal/semiconductor contacts II
- (iv) computer aided control engineering education II

There are three (3) on going research in the following areas:-

- (i) study of metal/semi conductor contacts II
- (ii) computer aided control engineering education III
- (iii) application of pulse width modulation DC-AC inverter in solar power generation system.

A number of staff members have attended ten (10) seminars held mainly in Nairobi.

(b) Publication

Twenty five (25) publications have been made in various journals.

(c) Participation in seminars, conferences.

A total of thirty one (31) papers have been presented in conferences and seminars. This shows the importance the department attaches to involvement of staff in academic activities.

(2) STUDENTS AND EXAMINATIONS

(a) Students intake

The department has a total of 132 students from first to fifth year of study. The capacity for the course is 30 students. The departmental intake has kept this capacity to ensure that facilities are not over stretched.

(b) Examinations

An average pass rate of over 90% has been maintained throughout the period.

(3) CONSOLIDATION OF UNIVERSITY EDUCATION AND RESEARCH

(a) Staff recruitment

Staff recruitment over the period in the following staff cadres is as indicated below:-

1990	Senior Lecturer	2
	Lecturer	7
	Assistant Lecturer	2
	Teaching Assistant	1
1991	Lecturer	1
1992	Senior Lecturer	1
	Lecturer	2
	Assistant Lecturer	1
	Teaching Assistant	2
1993	Lecturer	1
	Assistant Lecturer	0
	Teaching Assistant	3
	Teaching Assistant	2
1994	Assistant Lecturer	1
	Teaching Assistant	2
1995	Lecturers	3
	Assistant Lecturer	1
1996	Teaching Assistant	1

In total, the department has 27 teaching staff members. There is need to fill the establishment at professional level. Again, ultimate consolidation of the department, staff will need to be recruited at senior lecturer level.

(b) Equipment

Acquisition of most of the machinery and equipment is continuing and is almost complete.

(c) Stabilization of staff recruitment

The department has managed to retain staff recruited. However, further incentives in forms of internal promotions and scholarships will need to be provided to ensure that the industries and other major employers do not "poach" from the department.

(d) Teaching load

The teaching load for staff members is manageable.

(e) Syllabus Review

The reviewing of the syllabus is completed and approved by the senate. The implementation has begun with 1996/97 academic year 1st year B.Sc. students.

(f) Publications

So far 25 publications have been made in which fifty one (51) staff members have been involved. These are either publications made by staff members individually or jointly, with other staff members from the department.

(g) Seminars, Conferences and workshops organized

Staff members have participated in twenty three (23) seminars/conferences organized through JKUAT or JICA funding. A total of twenty three (23) papers have been presented in conferences/seminars.

These have either been held at Nairobi or at the University. The department has organized nine (10) seminars at the University. These have either been local or international.

(4) STAFF & STUDENTS RATIO.

The staff/students ratio is 1:8 which is ideal for practical oriented programmes that the department offers.

(5) STAFF WHO HAVE LEFT FOR FURTHER STUDY AND RETURNED WITH HIGH DEGREES.

NAME	AREA OF STUDY	COURSE	SPONSOR
F. Mumba	Computer Engineering	Ph.D Japan	Monbusho
E. Weke	Quantum electronics	M.Sc Japan	Monbusho
K. Gitundu	Power Systems	M.Sc Nbi	JICA(local)
Absolom Ouma	Communication	Ph.D Japan	Monbusho
J. Okello	Communication	M.Sc	Monbusho

(6) ADMINISTRATION AND MANAGEMENT OF THE DEPARTMENT

To assist in the Management of the department, it has a competent secretary who handles some of the administrative matters of the department. The secretary handles the computer needs of the department. However the department would appreciate if a copy typist is recruited to enhance efficiency in the office.

IV. DEPARTMENT OF MECHANICAL ENGINEERING

1. STAFF ACTIVITIES

(a) Research

Since 1990 members of staff have undertaken twelve (12) research projects of which eight (8) are still on-going projects.

(b) Publications

Three (3) completed research projects have been published and one is going to be published before the end of this year.

(c) Participation in Seminars and Conferences

Over the period of six (6) years four (6) members of academic staff have either participated or presented papers in seminars, workshops or conferences.

2. STUDENTS AND EXAMINATIONS

(a) Student intake

The students intake for the degree programmes has been kept at the accepted capacity of thirty (30) students per class. So far the students intake march the currently existing facilities. At the moment the department has 135 students studying for undergraduate program.

(b) Examinations

Over the past six years, the average examinations pass rate at first sitting and after supplementary examinations has been 87.4% and 97.02% respectively.

3. CONSOLIDATION OF UNIVERSITY EDUCATION AND RESEARCH

(a) Staff recruitment

From 1990 to date, the recruitment of academic members of staff at the various categories has been as follows:-

1990:	Associate Professor	-	1
	Senior Lecturer	-	1
	Lecturer	-	6
1991	Lecturer	-	1
1992	Lecturer	-	3
	Assistant Lecturer	-	2
	Teaching Assistant	-	4

1993	Lecturer	-	1
	Assistant Lecturer	-	1
	Teaching Assistant	-	6
1994	Lecturer	-	0
	Assistant Lecturer	-	1
	Teaching Assistant	-	2
1995	Lecturer	-	1
	Assistant Lecturer	-	1
	Teaching Assistant	-	0
1996	Lecturer	-	0
	Assistant Lecturer	-	0
	Teaching Assistant	-	2

(b) Equipment

Over the years the department has received from Japanese Government through JICA a substantial number of specialized machinery and equipment for teaching various courses. About 60% of the required equipment is already in place. More specialized teaching equipment in the areas of Production Engineering is needed, particularly (1) Metal forming equipment including rolling mill, wire drawing machine, power press extrusion machine and sheet forming. (2) Forging; open-hearth; (3) Foundry; moulding equipment, centrifugal casting machine and cooling machine.

(c) Stabilisation of staff recruited

The mobility of academic staff is very high. During the last six (6) years the department has lost fourteen (14) members of staff through resignation. The members of staff that have resigned got jobs in industries and other institutions within and outside the country which offer better remuneration. To curb this, trend there is need to consider qualified staff for promotion and further training to boost their morale and therefore retain them.

(d) Teaching Load

The total number of teaching staff in the department is eighteen (18). Four (4) of them are on study leave and one on sabbatical leave. Most of the staff are teaching three (3) courses a semester with one course being considered as an extra assignment and therefore payable. This practice has considerable reduced the problems previously experienced by the department in administering part-time staff.

(e) Review of syllabus

The review of the undergraduate syllabus is over and the teaching of first year are following the revised syllabus.

(f) Staff and students ratio

The staff student ratio is 1:10. This is rather high considering the fact members of staff are expected to conduct research and also assist with the teaching of Diploma programme. A 1:8 ratio is preferable.

(g) Staff who have left for further studies and returning with higher degrees

Currently the following members of staff are on study leave pursuing courses in the following levels and areas of study.

Name	Area of study	Level/country	Sponsor
S.P.Nganga	Mat. Science	Ph.D. S. Africa	World Bank
S. Wanjii	Fluid Mech.	Ph.D. Japan	Monbusho
P. Kibicho	Fluid Mech.	M.Sc. Nairobi	JICA-Local
B. Ikua	Mach. Design	M.Sc. Japan	Monbusho

More training opportunities in particular JICA third country training at M.Sc. and Ph.D level should be availed to members of staff who do not qualify for Monbusho scholarships on account of age.

4. ADMINISTRATION AND MANAGEMENT OF THE DEPARTMENT

More office and laboratory space is required for members of staff and research respectively.

FACULTY OF SCIENCE.

I. MATHEMATICS AND COMPUTER SCIENCE DEPARTMENT.

1. STAFF ACTIVITIES.

a) Research.

Several researches were conducted and completed by departmental staff during the period of co-operation. These include:-

- i. Human Resources Information Systems for JKUCAT - Computer Systems Project for Postgraduate Diploma in Computer Science. (Macharia, J. N.)
- ii. Generalised Recurrent Finsler Space of Second Order (Prof. S. M. Uppal)
- iii. On Hyper Surface of Finsler Phase II (Prof. S. M. Uppal)
- iv. Robust Estimation of the Error Variance of the Ratio Estimator - for Ph.D (Odhiambo R.O.)
- v. Magneto Hydrodynamics (Kinyanjui, M.)
- vi. The Role of Women in Technical Education (Gatharia,L.)
- vii. Effects of Hall Current in MHD Stokes Problem for an Infinite Vertical Plate. (Kinyanjui,M)
- viii A Distributed Genetic Algorithm for the Multiple Knapsack Problems. (Okech,J.)
(Accepted for IT-CSCC - Korea, July 1996)
- ix. Adaptive Nonparametric Variance Estimation for a ratio Estimator. : Accepted for Journal of Agriculture, Science and Technology (JAST) Nairobi. (Odhiambo R O)
- x. Statistical Program to Analyse Population and Sample Population using mean input, complete case analysis, hot deck imputation, bootstrap procedure and Jackknife procedure (Gatharia,L.)

The following researches are on-going:

- i. Magneto Hydrodynamic for PhD (M Kinyanjui)
- ii. Distributed Genetic Algorithms (Okech,J)

b) Publications.

The following books were published by departmental Staff:

- i. Secondary School Mathematics Book III - Published by Heinemann Publishers. (Humphreys, H.M.)

- ii. Secondary School Mathematics Book IV - East African Publishing House. (Humphreys, H.M.)
- iii. Revision Test Papers in Mathematics for KCSE - Published by Jomo Kenyatta Foundation. (Uppal, S.M., Humphreys H. M. (Ed) Applied Mathematics for Craft Engineering. Jomo Kenyatta Foundation. (Uppal, Huphreys, Gacheru' and Kamau')
- iv. Mathematics for Science. John Wiley Eastern, India. (Uppal, S. M. and Humpreys, H. M.)

The following books are to be published by departmental Staff:

- i. Introduction to Probability and Statistics. (Uppal, Humphreys, Wekesa, Odhiambo) (To be published by New Age International, India, Aug 1996)
- ii. Probability Distribution of a Single Variable. (Uppal, Humphreys, Wekesa, Odhiambo:) (To be published by New Age International, India, Sept 1996)

The following papers were published:

- i. A Paper entitled "MHD Stokes Problem of Convection Flow from a Vertical Infinite Plate Rotating Fluid" by Kinyajui, M. was published in the Journal of MHD and Plasma Research Vol 5 no 2/3
- ii. Grafting Software : Localization Constraints. (Computer Age Vol 2 No 1 P17, Juma Okech)

A number of staff members of the department submitted papers for publication in various journals. These include:

- i. Robust estimation of Error Variance of the Ratio. Estimator (Odhiambo R. O.)
- ii. A Comparative Study of Variance Estimator for the Ratio Estimator (Odhiambo R. O.)
- iii. On Hypersurface of Finsler Space II (Uppal S. M.)
- iv. Generalized Recurrent Finsler Space of Second order (Uppal S.M.)
- v. A Generalization of Gauzz-Cadazzi Equations for Relative Curvature Tensor (Accepted for Publication) (Uppal S.M.)
- vi. MHD Stokes Problem of Convection Flow from a Vertical Infinite Plate in a Rotating Fluid (Kinyajui, M)
- vii. Adaptive Nonparametric Variance Estimation for Ratio Estimator (Accepted for JAST) (Odhiambo R O)

c) Participation in Seminars, Conferences etc.

Members of staff participated in various seminars organized locally and internationally. The department sent staff to attend the seminars listed below:-

<u>Title</u>	<u>Name of Conference/Seminar.</u>
1. Kenya's Population Projections and some of their implications to Education Planning.	Population Conference
2. Mathematics in Population	African Congress of Mathematicians International
3. Demographic Transition of Population in Kenya's Western Province	Regional Symposium on Ecological and Cultural Change and Human Development.
4. The Use of Gompertz Relational Model in Fertility Estimation vis a vis Coale-Trussel Model.	Kenya Mathematical Society.
5. Logist Systems of Model Life Tables	Kenya Mathematical Society
6. Rice Production Trend in the Main Irrigation Schemes in Kenya	Mechanization of Rice Farming in Kenya
7. Cultural Determinants of Software Development in Africa	African Studies Association of South Africa, Johannesburg.
8. Student Management Systems: Student Management Program, Shooting Game Program and Statistical Program for Technicians.	Teaching Material
9. Robust Estimation of the Error variance	Mathematics Department, Kenyatta University
10. A Comparative Study of Variance Estimator for the Ratio Estimator	Accepted for Kenya Mathematical Society
11. Effects of Socio-Cultural Factors on Population Dynamics.	Short Course for Health works and Social Workers from NGOs.
12. Software Quality: The RUMP Approach	Computer Managers Congress

- | | |
|--|---|
| 13. Computer Education in Kenya | Computers and The Law Workshop |
| 14. Teaching of Mathematics With Special Reference to Assessment | Mathematics In-Service Seminar |
| 15. Robust Estimation of Error Variance | ULM University, Germany
Dept of Maths. |
| 16. Parallel Virtual Machine | University of the Ryukyus
Dept of Computer Science |
| 17. Specification and Analysis of Concurrent Systems using the COSY Notation | University of the Ryukyus
Dept of Computer Science |

Due to shortage of funds, the members of the department were unable to participate on many international conferences and seminars.

d) Students and Examinations.

Students are admitted once every year. They are registered in the Faculty of Science. Students choose to major in mathematics during their third year of study and therefore the statistics referred to are those of students in 3rd and 4th years of study.

During the 1996/97 Academic year, the student population was

Males	-	66
Females	-	10
Total	-	76

e) Examinations.

The examinations are conducted on a semester basis. Those who do not qualify sit for supplementary examinations at the end of the year or are discontinued if they do not pass a minimum number of units.

The pass rate during the examinations were as follows:-

	1992/93	1993/94	1994/95	1995/96
2nd yr (A)	88%			
3rd yr (A)	96.8%	73.1%		
3rd yr (8-4-4)		59.7%	100%	100%
4th year			99%	97%

2. CONSOLIDATION OF UNIVERSITY EDUCATION AND RESEARCH.

a) Staff Recruitment and Training.

The staff position in the department has improved greatly. The department now has one (1) Associate Professor, one (2) Senior Lecturers, Sixteen (16) Lecturers, Five (5) Assistant Lecturers and Four (4) Teaching Assistants.

The department continues to recruit and train the existing staff to enable it reach the Ideal Capacity.

Two members of staff have Ph.D degrees while most of the rest have M.Sc. degrees. Three members of staff are currently registered for Ph.D (2 locally, 1 abroad) while a number of others are awaiting funding to start their Ph.D programmes.

One staff members are currently studying for M.Sc. degree in Japan.

Two staff members successfully completed M.Sc. degrees in Australia while two completed locally (one under JICA sponsorship).

b) Equipment.

The department has 40 IBM PCs (Computers), 11 printers, 6 X-Y plotters and 50 boxes of mathematical models acquired through JICA.

This is still inadequate considering the number of students from all the university departments who use the computer laboratory. The department still requires more computers in order to provide adequate service to students and staff.

c) Stabilization of Staff recruited.

Between 1990/91 and 1995/96 Academic years 24 members of staff were recruited while 5 members of staff left of their own accord.

This implied the staff mobility is minimal. It is just above 10%. The university tried to recruit and retain staff as much as possible by motivation through certain incentives and even training. The department however still relies on part timers to supplement its staff requirements.

d) Preparation of Syllabi.

All the syllabi for undergraduate programmes have been prepared and approved by the Academic Board and Senate. However, there is constant review of syllabi as the need arises.

e) Staff Student Ratio.

The staff student ratio is still high. There are 529 students (FTSE) to 26 members of staff. The staff also service other departments in Engineering and Agriculture. Based on Full Time Student Equivalent, (FTSE), the staff student ratio currently is 1 to 20. This is still high and cannot enable staff to carry out research. It should be reduced.

Reliance on part time lecturers has greatly been reduced.

f) Teaching Load.

The average teaching load for the department currently is 3 units per staff member per week.

Each unit has 3 hours hence a lecturer has an average 9 hours. This is still higher than the normal figure.

h) Seminars, Conferences and Workshops attended.

The University has sponsored a number of staff to conferences, seminars and workshops within and outside the University.

The department organized seven seminars/workshops during the period of co-operation between JICA and the University.

II. DEPARTMENT OF CHEMISTRY.

1. STAFF ACTIVITIES.

A good number of staff members from the department have carried out and complete various researches while studying for the masters and Ph.D degree.

Dr. Githira completed a Ph.D degree on the "Extraction of Pesticide Residues from Soils". Using different methods from Carleton University in Canada while Dr. Keriko completed a Ph.D degree on "Chemical Studies on Biologically Active Constituents of Two African Medicinal Plants" from Okoyama University in Japan.

Three other members of staff Messrs Kiprono, Mugweru and Onani have also finished their masters degrees and are about to defend.

There are other research projects being carried out by our fourth year Chemistry majors under the supervision of some staff members in the department. Prof. Kaberia is involved in the analysis of Lead in Miraa plants while Dr. Chacha is currently involved in analysis of heavy metals in water from Ruiru River.

1. SEMINAR PARTICIPATION.

The Chairman of the Department, Dr. Githira and the Director of Post Graduate Studies, Dr. Chacha who is a member of the Chemistry Department participated in the J.K.U.A.T. Management Seminar in Green Hills Hotel, Nyeri. In this Seminar, positive deliberations were held geared towards improvement of the University.

2. STUDENTS AND EXAMINATIONS

The Faculty of Science currently has about 820 students. Out of this number, 680 students have Chemistry as one of their subjects. The Department also services all the other departments from the Faculties of Agriculture and Engineering.

The performance in university Examinations has been quite high as reflected by low failure rates at the end of each semester. The members of the department are highly committed to their work and there is great optimism that this trend will continue to improve the performance in University Examinations.

4. STAFF-STUDENT RATIO.

The staff to student ratio is about 1:1 which is very bad ratio. Some courses involve over 200 students which make marking CATs and practicals a nightmare for those involved. It is hoped that this ratio will be lowered in the future when funds become available. A lower staff-student ratio will enhance efficiency in the department.

5. TEACHING LOAD.

The Chemistry load is about two units per semester and takes about 12 hours per week. A smaller working load will enhance staff preparation which in itself enhances effective teaching. This will go long way to improve the academic standards in the University.

6. STAFF RECRUITMENT/TRAINING.

The Chemistry department has a total of 28 staff members who include the Dean/Faculty of Science and the Director/Board of Postgraduate Studies. About five of them are pursuing their Ph.D in overseas universities and will resume their teaching at the University at the University completion.

New members staff members are about to be recruited and it is my earnest hope that the Department Establishment for 1996/97 will change in order to cater effectively for the large number of students in Chemistry.

It also felt that the promotion criteria of staff in the department should consider all aspects of teaching and other specified duties pertaining to the welfare of the department and the entire University. If this is considered, there should be more people involved in the many university undertakings than is currently the case.

7. TECHNICAL STAFF.

The department has continued with a small number of technicians who are highly committed to their duties. It is anticipated that the department will be able to recruit more in order to cope effectively with the ever increasing load.

8. SECRETARIAL SERVICES.

The department continues to enjoy the services of a secretary who as tirelessly and devotedly served all the members (teaching and technical). The University needs to put in place criteria for promotion for this cadre improve upon the retention level and enhance their sense of belonging.

9. COMPUTER FACILITIES.

Due to the large number of students in the department and the fact that we have only one secretary, there is need to make use of the new technology in form of computer. This will help in the storage and retrieval of information. There is an urgent need of a computer in the department.

10. LIBRARY BOOKS.

There is need for Library books in the department due to the short supply in the University Library. The University is requested to increase the budget for the purchase of Chemistry text books.

III. DEPARTMENT OF PHYSICS .

1. STAFF ACTIVITIES.

a) Research.

Mr. D. Mulati is doing his Ph.D in Japan under Monbusho Scholarship. Mr. G. Kihara is doing MSc. in Australia under Australian Cooperation Scholarship (ADCOS). Dr. P. Karanja is working on the bending Piezo of Biaxially oriented polypropylene (BOPP).

b) Publication.

Several papers were published in various Journals. These include:-

- i Study of charge storage properties in Biaxially oriented polypropylene, TEEE Trans. Electr. Insul. EI-Vol. 28, pp. 294 - 298 (1993). By P. Karanja & R Nath.
- ii Electrical Conduction in Biaxially Oriented Polypropylene, J. Electrostatics Vol.31, pp. 51 - 63 (1993).
By P. Karanja & R Nath.
- iii Enhancement in charge Storage Stability of Hexane Treated polypropylene, J. Polymer Materials, Vol.10, No. 3 September (1993) By P. Karanja & R Nath
- iv Charge Trapping and Conduction in pure and iodine Doped Biaxially Oriented Polypropylene IEEE, Trans. Electr. Insul. EI - Vol.1 pp. 213-223, (1994) By P. Karanja
- v Transparent Conducting SnO₂ Films by Mwabora J. and Raturi A. M. Optical Absorption Studies of SnO₂ thin Films by Mwabora J. and Raturi A.K.

c) Participation in Seminars, Conferences e.t.c.

- i Mr. R Kinyua and Mr. J. Mwabora attended the 6th International Workshop on use of Micro-computers in Science in Kampala, Uganda - June 28th to July 7th August, 1993.
- ii Mr. Mwabora attended a conference on thin Film technology in Dar-es-Salaam - August 3 - 15, 1992.
- iii Dr. P. Karanja and Mr. Mugambi attended a First Seminar on Development of Diploma and higher Diploma in Physics, at Egerton University - May 24th to 25th 1996

2. Students and Examinations.

a) Students Intake

Currently the department has registered a total of 440 students. The breakdown is as follows:-

Year 1 - 226; Year 2 - 189; Year 3 - 10; Year 4 - 15

b) Examinations

Generally, the performance of the students during the semester and end of the year examinations has been good. The average pass rate as per last year's University examinations is about 95%. In 1994/95 academic year we had 8 students with second upper and second lower class honours and two with pass degree.

c) Staff Student ratio

The staff to student ratio is about 1.10 but the number is high for first and second year students. Now, with current splitting of large classes the ratio has gone down.

d) Teaching Load

We have 16 hours a week, which is 2 units per semester. Practical and tutorials hours are taken into account when working out teaching load.

3. CONSOLIDATION OF UNIVERSITY EDUCATION AND RESEARCH.

a) Staff Recruitment

Academic Staff.

There has been a slow increase in the recruitment of staff since 1990. In 1994 we recruited one Ph.D staff. In 1995 we recruited two teaching assistant. It has been very difficult to get Ph.D staff. The department has a total of 12 academic staff- one Senior lecturer, 8 Lecturers and 3 assistant lecturers.

Staff training and recruitment is continuing. On staff training, this very much depends on the scholarships available. For some scholarships available age limit become a hindrance to some old staff members. Something out to be done to assist them.

Technical Staff (Technicians)

During the period of cooperation a number of technical staff in the department have been recruited. There is one Chief Technician, 3 Technicians A/B/C and 3 Lab Attendants. We have also one Messenger and a Secretary.

b) Stabilization of staff recruited.

Since 1990/91 academic year a total of 3 members of teaching staff left on their accord. One passed away, the others left for the Dar-es-Salaam University and Kenyatta University respectively. In comparison with the number of staff recruited, the staff retention is quite high. All staff would however be retained with improved terms of service.

III. DEPARTMENT OF BIOCHEMISTRY

1. STAFF ESTABLISHMENT AND RECRUITMENT

1.1 Staff establishment

1.1.1 Academic staff

The department has 8 members and an additional 2 members (Teaching Assistants) are expected any time from now. Of the 8 members of staff, one is on study leave until 1998 while another is on leave of absence for one year.

1.1.2 Technical staff

The department has 6 technical members of staff of whom 1 is on study leave until 1997.

1.2 Staff recruitment

1.2.1 Academic staff

It is hoped that the department will be able to attract and recruit senior level staff (Associate Professor and Senior Lecturers) in the near future

1.2.2 Technical staff

The department recently recruited 3 members of staff to boost the technical section.

1.2.3 Stabilization of staff recruited

Since the inception of the department none of our members of staff be they academic or technical have left.

2. ACADEMIC PROGRAMMES

2.1 Student intake

Currently, the department has registered a total of 35 students. The breakdown is as follows:-

Year 2 - 12
Year 3 - 11
Year 4 - 12

The department would like to increase the intake from 12 to 20 per academic year if the expected World Bank equipment is delivered.

In addition to teaching in the department, the staff also service courses in the departments of Food Science and Post Harvest Technology (2 Units) and Horticulture (1 Unit).

2.2 Examinations

Generally, the performance of the students during the semester and end of year examinations has been good. The department has continued to receive favourable commendation from the external examiners on the mode of setting, quality of questions and student performance. The percentage passes for all the academic years since Biochemistry was introduced has been 100%.

2.3 Syllabi

There has been a thorough review, rationalization and harmonization of the B.Sc. Syllabus aimed at reducing duplication, incorporating relevant areas required by industries, research institutions, government institutions and the University.

The department has drafted an M.Sc. (Biochemistry) syllabus that is awaiting approval by the Faculty and Senate respectively.

2.4 Facilities and equipment

The department is in dire need of basic scientific equipment and instruments to facilitate and encourage training and research. The department would be grateful if it received any donations either as equipment or books to improve the teaching, training and research objectives of the department.

2.5 Teaching load

Currently each lecturer teaches an average of two (2) units per week. Each unit has five (5) hours per week, that is two lecture hours and three practical hours.

2.6 Staff student ratio

Currently, the staff student ratio is 1:20. This is worked out based on both our full time departmental students and students from service departments (Horticulture - 45, Food Science 50).

3. STAFF ACTIVITIES

3.1 Research

The members of academic staff have continued to carry out collaborative research. These include among others:

1. Cloning and sequence analysis of the genes that encode the delta endotoxin of B t effective against Glossina and Spodoptera exempta.
2. Determination of toxicity of B t delta endotoxin active against mosquito larvae on Culex, Aedes and Anopheles genera.

It should be noted that research was limited because most members of staff have written Ph.D research proposals which are being given priority in terms of fund allocation.

3.2 Publications

Several papers have been published in journals and as proceedings of seminars. Other papers have been accepted by the publisher and are awaiting publication.

3.2.1 Published

- a) Inhibition of mitochondrial electron transport by maesanin.
- b) Evidence for a free N-acetyl neuraminic and hydroxylating enzyme in pig mandibular gland.
- c) Studies on Bacillus thuringiensis effective against Aedes aegypti.
- d) Bacillus thuringiensis crystal endotoxin active against Chilo partellus

3.2.2 Accepted for publications

- a) Cloning and sequence analysis of Genes that encode the delta endotoxin of B t.
- b) The effect of plant Benzoquinones on insect flight muscle mitochondria.
- c) Characterization of a delta endotoxin the parasporal body of B t MF4B/z
- d) Studies on the delta endotoxin of a B t variety israelensis isolated in Kenya. Some Biochemical characteristics.

3.3 Conferences and Seminars

3.3.1 Participation

The record of staff participation in various conferences and seminars organized locally and internationally has been poor. This can be attributed to lack of funds and the crowded teaching schedule.

3.3.2 Organization

The department successfully organized and hosted the Fifth Biochemical Society of Kenya annual symposium at JKUAT in November, 1995.

3.4 Contacts with Industry and other relevant Institutions

Linkages with industry and other relevant institutions are being strengthened. Currently the department has links with TRFK, which

accepted one of our continuing students for attachment during the long vacation. The department is in the process of investigating the possibility of establishing formal links with ICIPE, ILRI, UoN, KETRI and KEMRI. The department wishes to express its sincere gratitude to ICIPE, UoN, and ILRI for the continued support it has received from them over the years.

3.5 Staff training

As most of our staff members require further (Ph.D) training, the department would like to express its appreciation to the University for all the efforts its making to ensure that our staff are trained. Secondly, our staff are making every effort to register for the Ph.D programmes and carry out their research.

4. PAST STUDENTS

Past students of the department have been absorbed by various institutions e.g. ICIPE, ILRI, BBK, Haco Industries and Cussons. One of our immediate students is pursuing an M.Sc. (Biochemistry) at University of Nairobi.

5. RECOMMENDATIONS

- a) For efficient storage of information, the department requires a computer.
- b) Laboratories both for research and teaching are inadequate, we recommend that this matter be given urgent attention.
- c) The department is requesting for a donation of any kind of Biochemical equipment or instruments that will enhance the teaching and research capabilities of the department.

VI. DEPARTMENT OF BOTANY

1. STAFF ACTIVITY.

a. Research.

Eight researches were carried out by members of staff during the period of co-operation. Some of the researches have been completed while others are still in progress.

The said researches are as follows:-

1. Genotoxicity of crude extract from Red Euphorbia.
2. Gene compatibility between wild type tomato 82/Cal.J.
3. Screening of Mai Bao-Treasure Tea fungus.
4. Hybridization of the wild type tomato with cultivated M82 + Cal. J.
5. Genotoxicity of roasted, fried and boiled goat meat extracts.
6. Screening of potato germplasm for potato late Blight.
7. Use of tissues culture to screen for drought resistant sorghum germplasm.
8. Extraction and characterization of the oil from Warbugia sp.

It should be noted that research was limited due to shortage of research funds. Some of the researches were carried out staff members pursuing their postgraduate studies.

b. Publications

During the period of co-operation, two papers were presented and published in Journals as proceedings of seminars. These include:

Ochora J. M., & Nagendran C. R. - The leaf and nodal anatomy in two species of harbular (canellaceae). Current science Banglora 1992.

Ochora J. M., J. C. Newton and Nagendran C. R. - The leaf and node and seed coat anatomy in two species of Warbugia. Botanical Journal of the linnean society.

Ngumi V. W., S. Takio and S. Takami. Photoautotrophic growth in cell suspension culture from Liverwort, Marchantia paleaceae Van Diptera. Journal of Plant Phsiology 137 (1) 25/28.

Training for Staff.

No staff members of Botany Department was awarded any training opportunity in Japan during the 1995/96 period although in the past, V. W. Ngumi did take up Monbusho scholarship. The department would be grateful if more such opportunities were available to the members. However, staff members did receive scholarships from Fulbright, USEPIA, the Netherlands as well as DAAD to pursue Ph.D programmes.

c. Participation in Seminars, Conferences, etc.

Members of staff participated in various conferences, seminars and workshops. These include:-

Title of Conference:-

1.	Japan Botany Congress	Japan
2.	Biological education for sustainable Development	Nairobi
3.	1st Biochemistry Symposium	Nairobi
4.	2nd Biochemistry Symposium	Nairobi
5.	Women in Science and Technology	Nairobi
6.	Pulsed field gradient Gel Electrophoresis and application	Nairobi
7.	Regional training course in Plant Pathology diagnostic techniques	Nairobi
8.	ICIPE Science Symposium of Developing Community-based technology in Agriculture	Nairobi
9.	Agricultural Science Workshops for School children at the Schomburge Centre for Black culture	New York
10.	Science collaboration for Agricultural development	New York
11.	Annual symposium on Biochemistry in the Advancement of Science and Technology	Nakuru
12.	1st African Regional Symposium on Biotechnology for Development	Nairobi
13.	Regional Symposium on Biotechnology for Development	Nairobi
14.	Models of assessing practical work in Biology	Nairobi
15.	African Regional Symposium on Biotechnology for development	Nairobi

Although members of staff participated in the above seminars, conferences and workshops, few published papers due to lack of funding for their preparation. However, a number of papers are in the process of being prepared. The department would be grateful however if more funds were available so that more journals can be made available in the library as well as other recent literature. This would go a long way to assisting in research activities which are right now hampered by lack of these materials.

2. Students and Examinations.

Students Intake.

Currently, the department has registered a total of 231 students.

The breakdown is as follows:-

Year 1	-	75
Year 2	-	50
Year 3	-	56
Year 4	-	50
Total		231

Generally, the examinations taken by students were well performed. Due to lack of funds, students projects have not been possible. We hope this situation will improve in the future.

3. Review of Syllabi.

All the syllabi for undergraduate programmes have been reviewed and the courses harmonized. They have been approved by the faculty boards and the senate and are now only awaiting publications. The current first years are now following the reviewed syllabi.

The preparation of MSc. and Ph.D syllabi are also at an advance stage and these programmes will be launched as soon as funds are available.

V. DEPARTMENT OF ZOOLOGY.

1 STAFF ACTIVITIES

a. Research.

During the period of cooperation six researches were carried out by 5 members of staff in the Department. Two (collaborative researches) have been completed and four are on going. Out of the four, one is a Department project on aquaculture while three are for purposes of Postgraduate Studies. The said researches are as follows:-

1. Innovative control methods for *Amblyomma Variegatum* (Fabricius, 19974) using entomopathogenic fungi *beauveria bassiana* *metarhizium anisopliae* and anti-tick botanicals in traps baited with attraction-aggregation attachment pheromone.
2. Studies on the interactions between *trypanosoma brucei* and haematophagus insects compared to *glossina*.
3. Bioecology of thrips in French been growing systems.
4. Limnological evaluation of the River Thiririka near Juja (Nairobi Kenya) - A source water for pisciculture.
5. Community based water resources project - Machakos District case study.
6. Community based water resources project - Taita Taveta District case study.

b. Publications

During the period of cooperation the following papers were presented and published in Journals. These include:-

1. Gitonga L. M. & Orago A.S.S. - Effects of dixamethasone on

antibody response and anaemia in sprague Dawley rats infected with Trypanosoma brucei brucei.

2. Mwachiro E. C. trace elements in the water of the reservoir Bari in Udipur (Rajasthan) and in the organs of the native fish cirhinus mrigala - in press.

c. Participation in seminars, conference etc.

Members of staff of the Department participated in various conferences and seminars organized locally and Internationally. These include the following:-

1. UNESCO International workshop - University of Witwatersrand South Africa.
2. The third International Conference of the Third World of Science, Technology and Development Forum - University of Natal - South Africa.

d. Students and Examinations.

i) Students intake.

Currently the department has registered a total of 227 students The breakdown is as follows:-

Year 1	-	72
Year 2	-	52
Year 3	-	53
Year 4	-	50
Total	-	227

The department wishes to reduce this number of intake to 50 per academic year.

ii) Examinations

Generally the performance of the students during the semester and end of the year examinations has been very encouraging. The percentage passes for the 1995/96 academic year was as follows:-

Year 1	-	92%
Year 2	-	100%
Year 3	-	100%
Year 4	-	96%

e. Consolidation of University Education and Research.

i) Staff Recruitment.

Academic Staff:

There has been a reasonable increase in the recruitment of staff since 1994. In the 1994/95 academic year 6 members of teaching staff (one Professor, 2 lecturers, 3 assistant lecturers) were recruited into the department. Again in the 1995/96 Academic year

2 members of teaching staff in the category of Assistant Lecturers were recruited bring the total number to 16.

Staff training and recruitment is continuing as per recent advertisements. 6 members are currently out on their Ph.D programmes. Three of these are however local.

Technical Staff.

During the period of the cooperation, 2 members of technical staff were recruited into the department.

At present the department has one Chief Technician, 2 technicians and 2 laboratory assistants.

ii) Stabilization of staff recruited

Since 1994 four members of staff have left the department. One Professor joined Baraton University as Vice-Chancellor, one Assistant Lecturer joined her husband in West Africa, while another one joined her husband in U.S.A. One Assistant lecturer left to joined Moi University at a higher grade. The staff retention has generally been fair. However, all could have been retained with improved terms of service.

iii) Staff Student ratio:

In addition to teaching in the department, the staff also service courses in the departments of Horticulture and Food Science.

Currently, the staff student ratio is 1:14 based on the FTSE'S (Full Time Student Equivalent).

iv) Teaching Load:

Currently each lecturer teaches an average of two (2) units per week. Each unit comprises of 3 hours of practical and 2 hours of a lecture totalling 5 hours per week.

v) Preparation of Syllabi

The syllabus for the undergraduate programmes has been prepared and passed by the Senate. It has been adopted with this years intake of first years (1996/97 academic year). The M.Sc. syllabus has been drafted and discussed at departmental and Faculty levels. It is awaiting approval of the Senate.

vi) Things to be noted and highlighted

Participation in seminars/workshops/conferences has been hindered of funding. Hence there is need for increased funding to enhance seminar participation.

Research has also been hindered by lack of funds and adequate equipment. The department recommends that this should be given priority.

INSTITUTE FOR HUMAN RESOURCES DEVELOPMENT (I. H. R. D)

a) Academic Staff.

There are currently 15 members of teaching staff. Of these members only 3 members have Ph.Ds and 1 is currently on study leave studying for Ph.D. There is therefore an urgent need to offer the remaining 11 members of staff who have masters degrees scholarships to study for Ph.Ds. Members of IHRD have not yet benefitted from JICA Scholarships.

In 1994, the number of staff members was 17. Two members of staff who have left the University since then, have not been replace. There is need to replace staff members who leave the Institute so that some areas of specialization do not remain under-staffed.

b) Research.

Staff members of IHRD have been involved in 10 research projects and presented them at various local and international forums. These research projects have been funded by both local and international Agencies.

In future, the Institute intends to focus its research in the area of entrepreneurship. It would like to see JICA involved in the funding of these research projects.

c) Publications.

A total of six books have been written by members of staff between 1992 and 1996. A number of manuscripts from staff members are currently with publishers

d) Remarks

The institute feels that it should be a beneficiary of JICA aid to boost its staff development and research projects.

UNIVERSITY LIBRARY.

1. INTRODUCTION.

A University library is the centre of all learning, teaching and research activities of the University. It is the resource centre without which the academic activities cannot be realized. This report will point out some of the facilities that exist in the library which enable the library to play its role as a resource centre.

2. BOOK STOCK

As revealed by table No. 1, JICA is the largest donor of library books to date. JICA'S total contribution for the period between 1991 - 1994 was slightly over 7,000 books. This figure has almost doubled to over 13,000

The table also reveals that there is need for more books from the Kenyan sources. This would enable the library to increase its stock at a higher rate and thus provide a reasonable number of books required for use by the increasing number of students and lecturers.

3. STAFF.

There are a notable improvement on library personnel. The total number of staff has risen from 42 to 49. Increased number of professional staff has made it possible to introduce extra services such as E-mail, Specialized subject reference services and technical services.

4. STAFF TRAINING.

Since 1990 training of support staff has been reasonably catered for as can be seen in the table on training. However, none of the senior staff have been given any form of training. This has been realized and action has been taken such that this year, 1996, four senior staff are recommended to take ESAMI courses. There is however a need for staff to be fully exposed to modern information technology.

5. OTHER LIBRARY ACTIVITIES.

- a. Library staff have participated in various seminars. Some of them have presented papers in certain seminars.
- b. The library mounted a book exhibition and had invited participants from major book sellers and publishers in Kenya.
- c. Income generating activities newly introduced in the library have a promising future. This is an area which needs special focus for development in terms of staff and machinery.
- d. Computerized information services such as E-mail, Internet and Fax have been introduced in the library and it is hoped that when the library is provided with extra computers, it will be possible to computerize most of the library operations.

RESEARCH, PRODUCTION & EXTENSION DIVISION.

UNIVERSITY FARM

1. Introduction

The tuition farm made steady progress over the years in farming activities since the installation of the irrigation network for the 20 hectare portion of the 144 hectare farmland. The installation of the irrigation system was completed in February 1985 and from March of the same year production of various crops was started. Cattle and pigs had been introduced earlier in 1984. These two livestock enterprises have been maintained and plans are underway to improve and expand them. The crop production section of the farm is divided into five equal blocks each covering an area of 4 hectares of land. The blocks are named A, B, C, D and E. Block A is exclusively used by the horticulture department for some of the field work for students. Intensive cultivation is carried out in block B, C and E. Block D is an Orchard area planted with Citrus, Pawpaw, Avocado, Mangoes, Grapes and Passion fruits. Block E was opened for the first time in 1988 for use as a museum plot grown. Other parts of block E are intended for fodder crop mainly Lucern which provide high levels of nutrients to animals.

The University farm was set up to cater for the needs of:

- i. Tuition - mainly to those students taking courses in agriculture.
- ii. Research - Both for students and staff
- iii. Demonstration - For extension purposes to the community in and around JKUAT
- iv. Commercial production (Income Generating Unit)
- v. Producing raw materials - Mainly for other departments especially the department of Food Science and Post Harvest Technology.

The above named objectives of establishing the farm should not be viewed as being exhaustive as there is always room for flexibility in accordance with changing University development policies. For example the Farm has been used to teach and demonstrate to women farmers who undertake a one month residential course at the university.

2. Staff

The current permanent staff consist of a Farm Manager, two Assistant Farm Managers for crops and livestock, six technicians and a number of general workers. From time to time the farm recruits casual employees the number of which is determined by the nature of activities on the farm.

At present there is only one Japanese Expert on the farm Mr. Kiyoshi Kita who is a graduate in horticulture. He joined the farm in 1988.

3. Staff development

A lot of improvement has been observed in this area, thanks to JICA for allocating some training opportunities to farm staff. In 1991/92 two technicians went to Japan on JICA Counterpart training programme.

In November 1993 another technician went to Japan to train under the same programme. He has since completed his training and is now back on the farm. In May 1995 one more technician underwent training in animal feed production. In May 1996 a recommendation was given for another technician to undertake a counterpart training in irrigation water management. This has been accepted and the technician is due to leave in July for Japan. The Assistant Farm Manager (crops) has undergone a farm machinery training in Japan (1990 - 1991) and a specialized poultry training in Netherlands 1993/94. He is currently undergoing a Masters degree in Agricultural Education in the United Kingdom (U.K.).

The Deputy Farm Manager (Livestock) went to do a Masters course in veterinary medicine in Australia in February 1993 and came back in August 1994. He has taken over as the Ag. Farm Manager since 1995.

4. Transfer of Technology

Various Japanese Experts and Volunteers have, at one time or the other in the development of the farm, worked with Kenyans on the farm and there is not doubt as to the transfer of technology to farm staff during the day to day interactions in the performance of activities in the various farm section.

5. Farm Projects

Farm activities are carried out following a cropping map that covers the whole of the 20 hectare irrigable land for a period of one year. The crops to be grown within the specified period are carefully selected on the basis of:

- soil condition
- adaptability
- local demand
- profitability
- yield capacity
- disease and pests resistance as well as
- nutritional value
- on the unirrigated land, there has been a vigorous expansion of the fodder crops. Approximately 4 ha are on improved pastures.

6. Vegetables

Until 1985 these were grown in Block A. This block has the greatest potential in terms of soil fertility. There was an initial nematode attack problem which has to a great extent been eliminated in a variety of ways. This block now falls under the horticulture department and is exclusively used by students and staff for experimental and research work. The farm now grows a variety of vegetables in block B through E depending on the demand. Mainly there is kale production for students kitchen supply.

7. Livestock

There are two livestock enterprises on the farm namely, cattle and pigs. The two were introduced way back in 1984. The cattle herd has been maintained at around one hundred with thirty milkers and the rest being steers, heifers and calves. The cattle are crosses of various dairy, beef, and dual purpose breeds. The dairy cross breeds are not high yielders and therefore production fluctuates between four and six thousand kilogrammes of milk per month on the average. This quantity of milk is far much less than the demand from departments and the University Community. Plans are at an advanced stage to purchase fifty additional dairy cattle to be placed on a zero grazing unit. Plan has been drawn and construction work is expected to start as soon as funds are available. To improve the dairy herd A.I. (Artificial Insemination) was introduced in January 1993. Also an area covering 4 hectares has been planted with various fodder crops in readiness for the zero grazing herd. The farm is able to improve its herd on productivity coupled with suitability of the animals to the environment. The other livestock enterprise in existence is a pig herd that has about four hundred animals in the various growth categories. There is a lot of improvement on the houses for pigs and we expect to have 1000 pigs every year. The pig sales have been generating some income for used for both teaching and research.

8. Crops

During these times financial scarcity the University College has encouraged the introduction of income generating units in all departments and the farm is no exception. The crops which are being grown now are those which are purely income generating.

9. CONCLUSION AND RECOMMENDATION

i. Training

With the growth and expansion of the University to a fully fledged University there will be need to offer farm staff training for higher qualifications in order to meet the standards of a University farm.

ii. Equipment and Spares

The farm has continued to get support in procurement of machinery and spare parts from JICA. We are grateful for this kind gesture and hope that this support will continue when need arises. Our present irrigation system has been stretched to the limit and any future expansion will need more money to lay the necessary pipe network. Future assistance in this area would enhance the farm's activities.

iii. Intake pumping station and storage pond

Already there is an increased demand for water from the present storage pond due to the recent installation of a water purification plant for university domestic water supply. To meet this more increased demand for water more frequent pumping than was previously the case is already in place. As the pumps and motors will be working more frequently it is felt that there is need to acquire some spare parts specifically for Ndarugu intake pumping station and also for the booster pumping station.

ENGINEERING WORKSHOP UNIT

INTRODUCTION.

This department was created in July 1994. It has place together under one management three different areas namely:

- UPI - Institute of Production and Innovation
- S.E.M.U. - Scientific Equipment Maintenance Unit
- WORKSHOPS - Areas covered by Civil, Architecture and Mechanical Departments.

Engineering Workshops has consolidated all areas of purchasing, practical work training, internal practical attachment and some production.

STAFF RECRUITMENT AND TRAINING.

Recruitment.

The establishment of the Workshop has remained stable over the last six years. Staff have been moved across department through normal rotation. No new recruitment has taken place. Upward staff mobility is reviewed on yearly basis and appropriate recommendations made.

Training

Our chart on training show heavy training both locally and externally. The momentum will be maintained so that staff quality may be enhanced such training will place the technician in better position to sustain productivity.

Equipment requisition

The department has not requested for new equipment from Japan.

Teaching Local

1st Semester -	1996 -	114 hours
2nd Semester	-	140 hours

Administration of department.

The unit is headed by a Manager who co-ordinates the workshop operation assisted by several support staff.

The Workshop are part of the Research Production and extension division. The deputy Vice-Chancellor advises on both long term and short term goals. In the fiscal year 1995/96 the department opened a section for education equipment. It is currently producing physics equipment for schools.

**JOMO KENYATTA UNIVERSITY
OF AGRICULTURE AND TECHNOLOGY**

**SUMMARY MASTER PLAN
(1994 - 2004)**

JUNE 1994

TEN YEAR PLAN PROJECTIONS (1994 - 2004).

1. ACADEMIC PROGRAMMES.

JKUAT plans to continue offering specialised education and training in the fields of Agriculture, Engineering, Science and Enterprise Development.

Degree Programmes.

The current programmes will be further consolidated and reviewed to improve on their effectiveness and suitability.

Possible areas of diversification have been identified in some departments; e.g. Information Engineering, Computer science and Dry-Land Agriculture. New programmes to be introduced will have to satisfy strict criteria already set:

- be justified by national need
- have provision for extra funding and physical facilities so as not to encroach on existing ones.

Postgraduate Programmes.

As departments grow in staff strength postgraduate degree (and in some cases postgraduate diploma) programmes will be started. There will be strict criteria for approving the courses to be established. This will eliminate duplication. Interdisciplinary programmes addressing global issues will be favoured. Current projections indicate that full scale courses may be launched from 1997. Doctoral programmes for staff development which have already started will continue.

Diploma Programmes.

The University has a strong base for offering various undergraduate diploma courses as well as short-term special courses. Regular diploma programmes will be reviewed and only those in high demand retained. Others will be phased out. Special certificate courses to meet the needs of industry will be mounted. These courses will be for income generation to augment budgetary provisions for teaching materials.

2. STAFF DEVELOPMENT.

The University has made good progress in its staff development programme. However the proportion of staff having doctorate degrees is still very low varying from 5 -20% per department. The University plans to intensify staff training in order to raise this proportion to 70 - 90% by the year 2004.

Strategies to be used include:-

- a) Technical cooperation projects and other donor assistance
- b) Staff linkages with universities and research institutions
- c) Additional government budgetary provision
- d) Departmental funding through income generation.

Training of technical staff will continue. Tables 2 and 3 give details of projected staff and staff training.

3. RESEARCH.

The University has made satisfactory progress in research activity. In order to improve upon this achievement plans have been made to:-

1. utilize existing facilities more effectively for research.
2. provide a positive reward system for patentable/marketable research output.
3. strengthen collaborative research through linkages with institutions and organizations.
4. establish additional facilities through joint projects with donors, agricultural sector and industry.

4. LIBRARY.

Current assistance to the Library comes mainly from the Japanese cooperation project and the Universities investment project (World Bank). The two projects have covered provision of books as well as some equipment. The JKUAT Library requires books, journals and periodicals in highly specialized areas.

5. PHYSICAL FACILITIES

a) Academic Facilities

1. Faculty of Science.

The University started constructions in 1990 to provide for the then new faculty of Science. A total of Shs.850 million is still required to put up these facilities. Equipment for the existing G GoK Science laboratories is being provided for through normal budget allocation and the World Bank project (up to 1996). The University plans to shop around for external assistance in equipping the complex under construction.

2. Other facilities.

Various departments have planned for additional laboratories and rooms to provide particularly for research and postgraduate work. These facilities will go with additional office accommodation for the projected increases in academic and technical staff.

b) Research/Training Centres.

1. Faculty based centres.

The faculty of Agriculture plans to establish a research centre which will serve as a national/regional focal point for research in;

- i) dry-land farming
- ii) food processing and postharvest technology.

The centre would also offer non-degree training required by relevant subectors.

The faculty of engineering plans to establish a small scale manufacture centre which would offer industry oriented training in addition to carrying out production work.

Faculty of Science plans to establish a centre for production of school science equipment. This will improve science teaching in schools as well as generating income for the faculty.

c) Income Generating Facilities.

1. Engineering Workshops

Engineering workshop management has been re-organized to accommodate and expand income generating production. In order to expand this activity additional workshop facilities will be required. When fully operational, the workshops will become self-financing and provide extras for practical training.

2. University Farm.

Current projections indicate that the income generated from the current farm will continue to grow up to 1996/97. In order to sustain the increase in income the following have been planned:

- i) Expansion of the farm by another 50 hectares immediately.
- ii) Intensification of livestock production.

Various subprojects have been developed for these purposes.

d) Welfare Facilities.

1. Health Centre.

The university Health Centre (Hospital) needs to be equipped adequately. This will drastically reduce expenditure on external medical service to staff and students. It will also generate income to the university by providing and charging for, medical service to non-university patients.

2. Hostels and Kitchen.

Additional halls of residence were started in 1990 to cope with the increasing student population. Plans for completion have been disoriented by inadequate budgetary provision.

Current practice in Kenya public Universities dictates that the incomplete project be finished.

3. Student Centre

The University plans to build a centre to cater for social and recreational activities of the student community. Funds for this project will be sought from well wishers and organisations.

4. Staff Houses

JKUAT being situated away from major urban centres requires houses to accommodate members of staff. The housing project started in 1990 stalled due to scarcity of funds. It is planned to complete this project as soon as funds are secured.

5. School (Jomo Kenyatta Academy)

The university started and nurtured a primary school which caters for child of its staff. Plans to erect permanent structures for the academy are ready. The university and the Parents Association are embarking on a major fund raising project for this purpose.

6. Resource Centre

The university plans to establish a multi-purpose resource centre for agricultural technology. This centre will have facilities for research, seminar rooms, conferences and recreation for staff.

7. Games and Sports

JKUAT actively participates in games and sports at local, national and international levels. Plans are under way to develop fields and courts for various competitive and leisure games/sports.

SIX-YEAR DEVELOPMENT PLAN (1994-2000)

1. ACADEMIC PROGRAMMES.

The university will continue offering high quality education and training in the fields of Agriculture, Engineering, Science and Entrepreneurship. Existing programmes will be strengthened while higher level ones will be introduced gradually.

1.1 Undergraduate Programmes.

Current undergraduate degree programmes will reach full cycle in the period 1994/5 - 1996/7. During this period the University does not intend to introduce any new programmes. Emphasis will be on consolidation of the existing programmes to ensure that they achieve the original objectives.

Graduates of the current programmes will enter the job market from 1995/96. Feedback on the quality and suitability of the programmes and products will be evaluated over the period 1997-1999. The university therefore plans to arrange as much as possible for continued support of the current programmes from existing sources up to the year 2000 in order to ensure complete consolidation.

Diversification of undergraduate programmes will be dictated by availability of additional facilities and/or reorganization of existing programmes.

1.2 Postgraduate programmes.

Before mounting full-scale postgraduate programmes, the university has to establish the following:-

- a) adequate number of highly qualified staff (Ph.D holders) with appropriate research experience.
- b) adequate equipment and laboratories to facilitate postgraduate projects and research.
- c) sources of funding for the programmes.

It is however planned that various faculties will embark on postgraduate programmes in their fields of specialization as a follow-up of the undergraduate courses.

Limited (individualised) doctoral programmes started in 1994 with Japanese funding and will continue as a means of enhancing staff development.

The proposed possible dates for starting various postgraduate programmes are shown in Table 1.

1.3 Diploma Programmes.

As the University diversifies undergraduate degree programmes and introduces postgraduate studies, existing diploma programmes will be reviewed and some phased out. However those programmes in high demand by the labour market may be retained on a competitive income generating arrangement. The phasing out process would start in 1995/6.

2. STAFF DEVELOPMENT.

Staff development is an expensive and slow process. It takes not less than six (6) years to recruit a fresh graduate and train him/her to doctoral level.

In most academic departments the number of staff with doctoral qualifications is very low (1-4). It is desirable that all departments be staffed mainly by holders of doctorates in relevant branches of specialization. The university plans to intensify existing staff development programmes and to solicit additional support to achieve this goal. Continued training of technical support staff is also necessary. Projected staff qualifications for the years 1994, 2000 and 2004 are shown in Table 2.

Plan of action for staff training.

2.1 Project Technical Cooperation support:

a) The university has prepared requests for continuation of the existing technical cooperation to ensure that the ongoing staff development base is maintained. If current levels are maintained then departments supported by this project will attain 50-80% adequacy by the year 2000.

b) The University has prepared for other technical assistance projects focussing largely on staff development. These include the on-going Universities Investment Project (World Bank) and the Entrepreneurship Education project (ILO/UNDP).

2.2 Linkages.

The university has established linkages with other institutions and organizations which will be utilized to enhance staff development by providing training funds and research facilities. These linkages will be expanded so as to cater for 5-10% of staff training by the year 2000.

2.3 JKUAT Funded Programmes.

Every income generating sub-project at JKUAT will be structured in such a way as to support a specific and relevant aspect of staff development. This will in particular benefit technical staff training and also facilitate concentration of external funding on higher level staff training for academic programmes and research.

Special attention will be focussed on utilization of existing facilities (and in future expanded facilities) for conducting short-and medium-duration courses for purposes of raising additional funds to support staff development.

3. ENHANCEMENT OF RESEARCH.

Expansion of research activity and output has been hampered by inadequate funding, limited equipment and laboratories, lack of up-to-date books and journals.

The univeristy plans to take the followings steps to strengthen its research base by the year 2000:-

- a) Exploit existing linkages and establish new ones with;
 - i) national and international research institutes,
 - ii) non-governmental development organizations engaged in capacity building and human resource development.
 - iii) universities with better developed research bases.
 - iv) industry.

In each case the collaborating institutions will initially provide the bulk of financial support. By the year 2000 however, returns from research output should be able to sustain programmes established under these arrangements.

- b) Establishment of facilities specifically designed for research and training in the following areas
 - i) food processing and postharvest technology - with donor funding.
 - ii) arid and semi-arid agriculture - with local and international collaboration.
 - iii) small scale agricultural implements productions - singly and/or in collaboration with local industry

- iv) **entreprise development - in collaboration with industry and with development organizations**

Initial capital for development of facilities will be solicited outside budgetary provisions. The above programmes/projects are planned to become self-sustaining within periods of one year after launching.

- c) **Establishment of Research and Consultancy unit(s) to facilitate and coordinate dissemination and marketing of output as well as services available at the university.**

4. UNIVERSITY LIBRARY.

The university Library still requires much assistance in stocking books, journals, periodicals and automation.

The Japanese Technical Cooperation project continues to be the major support for the library. The Universities Investment Project has earmarked US Dollars 280,000 for the JKUAT Library between 1993 and 1996. The Library continues to rely heavily on external assistance because most of the required books are not locally available.

Desk-top published will be introduced as a precursor to the the establishment of a university press. Initial/basic equipment will be provied under the Universities Investment Project.

5. ON-GOING DEVELOPMENT PROJECTS.

A number of projects started in 1990 are yet to be completed. Stalling of projects has mainly been caused by shortfalls in budgetary provision and non-release of allocated funds.

5.1 ACADEMIC FACILITIES.

i) Faculty of Science Building.

This project was initially planned for implementation from 1990 to 1992 at a cost of about K.Shs.360 million. Delay in implementation has caused escalation of the projected cost to K.Shs.850 million. This is a core/high priority project if physical and biological sciences are to be well established in the university.

Consultations with government will continue in order to identify firm sources of funding to ensure completion of the project. Basic equipment for the Faculty of Sciences is planned to be provided during 1995 and 1996 under the Universities Investment Project (World Bank funded). The equipment is estimated to cost K.Shs.150 million. Major among these will be the setting up of adequately equipped computer laboratories.

ii) Engineering Workshop Equipment.

In order to enhance internal practical training additional engineering equipment worth K.Shs.18 million is planned to be provided under the Universities Investment Project during 1995 and 1996.

5.2 HOSTELS AND KITCHEN.

This project - in two phases - was started in 1990/91 and scheduled for completion in 1992/93. Phase one, consisting of one hall and a kitchen complex is 90% complete. It is planned that this phase will be completed in the 1994/95 year. The second phase needs to be completed by 1996/97 if growth in student population is to be maintained for current programmes.

Completion of phase one will require K.Shs.80 million, while phase two will require K.Shs.400 million.

5.3 UNIVERSITY HEALTH CENTRE (HOSPITAL).

Construction of the University health centre was completed in 1991/92. However the facility is yet to be adequately equipped.

The University plans to solicit equipment and funds from various sources to make the hospital fully operational. Once completed the centre will extend services at a cost to the community around the university as a means towards self sustenance.

5.4 STAFF HOUSES.

The staff houses project started in 1990/91 is still in its infancy. The location of the University in a rural setting this project a high priority one.

6. INCOME GENERATING PROJECTS.

6.1 Expansion of Engineering Workshops.

Restructuring of the management of engineering workshops to enhance production/income generating activities takes effect from 1994/95. For this objective to be fully realised the existing machinery needs to be upgraded. Expansion of the building will also be necessary during the plan period (1995-1999).

6.2 Expansion of Farm.

The developed section of the university farm, consisting of 20 hectares is inadequate for current tuition and production needs. It is planned to extend the farm by another 50 hectares in the period 1994 - 1996. The additional farm area will be used for income generation to improve self sufficiency and sustainability.

Livestock production will be increased by expanding the poultry unit, piggery, dairy unit and by introducing fish farming.

7. RESOURCE CENTRE FOR AGRICULTURE AND TECHNOLOGY

JKUAT aims to develop into a regional centre of excellence in agriculture-oriented technology. In pursuit of this goal, plans exist for establishment of a centre to offer special facilities for researchers, including computer databases and access to data in other institutions through appropriate networks.

TABLE 1 ACADEMIC PROGRAMMES AND STUDENT POPULATION

	1994	1995	1996	1997	1998	1999	2000
<u>EDUCATION</u>							
Bachelors degree							
Masters degree							
Doctoral degree							
Diploma							
Postgraduate diploma							
<u>STUDENT POPULATION</u>							
Bachelors degree	1553	1640	1700	1750	1815	1860	1915
Masters degree	30	30	30	80	100	130	150
Doctoral degree	6	10	15	20	25	30	30
Diploma	514	500	480	400	300	200	150
Postgraduate diploma			20	40	60	80	80
TOTALS	2103	2180	2245	2290	2300	2300	2325

NOTES: Definite courses run - - - - - Earliest probable start/stop
 Courses by special arrangement * * * * * Staff development programme

ACADEMIC STAFF PROJECTIONS BY DESIRED QUALIFICATION

DEPARTMENT	1994 (INPOST, June 30)					2000 (TARGET)					2004 (TARGET)					
	PhD	MSc	BSc	Tot	PhD	MSc	BSc	Tot	PhD	MSc	BSc	Tot	PhD	MSc	BSc	Tot
AGRIC. ENGINEERING	4	18	--	22	26	10	4	40	35	6	4	45	35	6	4	45
FOOD SC & PH TECHNOLOGY	4	8	1	13	20	12	4	36	26	10	4	40	26	10	4	40
HORTICULTURE	2	13	3	18	18	12	4	34	26	14	4	44	26	14	4	44
ARCHITECTURE	2	15	10	27	19	20	6	45	29	20	6	55	29	20	6	55
CIVIL ENGINEERING	3	19	8	30	29	15	6	50	39	15	6	60	39	15	6	60
ELECTRICAL ENGINEERING	2	12	9	23	24	20	6	50	39	15	6	60	39	15	6	60
MECHANICAL ENGINEERING	2	11	7	20	19	20	6	45	29	20	6	55	29	20	6	55
BIOLOGICAL SCIENCES	2	25	5	32	24	18	6	48	34	15	6	55	34	15	6	55
MATHEMATICS & COMPUTER	2	20	4	26	26	18	4	48	26	16	4	60	26	16	4	60
PHYSICAL SCIENCES	4	25	7	36	24	20	6	50	39	15	6	60	39	15	6	60
LIBRARY	--	4	4	8	1	10	10	21	2	10	10	22	2	10	10	22
INST FOR HUMAN RESOURCE DEVPT	2	14	1	17	20	4	--	24	25	5	--	30	25	5	--	30
ADMINISTRATION (**)	-	7	23	30	8	20	20	48	10	30	20	60	10	30	20	60

NOTE (**): Administration for this table EXCLUDES executive appointees and includes all non-academic sections.

Kenyan take-over of programme

End of project

1990

IMPACT EVALUATION

2000

IMPACT EVALUATION

1988

CONSOLIDATION PERIOD

CONSOLIDATION PERIOD

Diploma & Technician Courses

1985

1995

ESTABLISHMENT PERIOD

ESTABLISHMENT PERIOD

Technician Courses (Engineering)
Diploma Courses (Agriculture)
{ Duration of Courses 3 - 4 years }

1981

Undergraduate degree courses
(Agriculture and Engineering)
{ Duration of Courses 4 - 6 years }

1990

FIRST PROJECT

SECOND PROJECT

1. The Financial report submitted to the JICA Mission in 1994/95 covering the period 1990/91 to 1994/95 did not include the Central Services Expenses related to academic programs. In this report, the Expenses have accordingly been apportioned.
2. While compiling the report from 1990/91 to 1994/95 expenditure on personal emoluments was based only on gross salary. This report has included pensions, gratuities, NSSF, medical and other personal allowances paid to academic staff.

In view of the above, the figures which had been submitted to JICA for the period 1990/91 to 1994/95 will be different. The figures in this report are comprehensive.

3. Apportionment:

Central Services Expenses related to academic programs have been apportioned to Educational materials as shown below:

a) Using Students Ratio (per Department).

The following expenses have been enhanced to educational materials:-

- i) Purchase of stationery:- the total cost of stationery has been apportioned such that 2/3 be charged to teaching departments and 1/3 to administration.
- ii) Purchase of equipment: as (i) above
- (iii) Publishing and printing: the whole expenditure apportioned to teaching departments.
- iv) Joint Admissions Board Expenses - as in (iii) above (for degree students).
- v) Field attachment: to Faculty of Agriculture and Faculty of Engineering.

(ii)

b) Using Staff ratio: (per Department)

The following expenses have been apportioned to teaching departments as indicated:-

- i) Medical: enhanced to personal emoluments
- ii) External travel, per diem, airport tax, post graduate studies: enhanced to training.
- iii) Seminars and Conferences
- (c) Shared equally (by specific consumers)
- vi) Gas and Fuel:- 50% to kitchen, balance shared equally to the following departments: Workshops, FSPT, Biological and Physical Sciences.
- vii) Purchase of production supplies:- Shared equally between Workshop and Farm.

7.0 KENYAN INPUT

7.1 INCOME FOR THE PROJECT PERIOD (Amounts in KShs)

Kenyan FY	Actual Income (Min. of Education)	Actual Income from Tuition fees	Actual Other Income	TOTALS
1990/91	88,872,818	1,597,793	16,697,375	107,167,986
1991/92	87,812,652	7,458,868	15,685,669	110,959,189
1992/93	97,269,657	15,177,117	5,701,279	124,261,995
1993/94	117,457,270	12,387,098	15,008,040	151,514,359
1994/95	184,010,360	21,334,124	11,732,683	227,289,532
1995/96	269,911,630	30,734,164	14,820,403	317,276,572
TOTAL	845,334,387	88,689,164	79,645,449	1,038,467,663

7.2. ACADEMIC AFFAIRS EXPENDITURE (Amounts in KShs)

7.2.1 Agricultural Engineering

Kenyan FY	Educational Materials	Research	Seminars & Conferences	Transport & Travel	Personal Emoluments	Training	TOTALS
1990/91	1,083,720	-	16,304	92,613	4,050,122	73,139	5,315,898
1991/92	650,945	-	24,321	126,442	4,143,016	14,186	4,958,910
1992/93	917,245	-	4,141	39,915	5,599,723	52,066	6,613,090
1993/94	430,965	-	15,794	34,986	5,804,545	37,615	6,323,905
1994/95	540,444	-	2,117	72,393	7,471,246	23,369	8,109,569
1995/96	581,271	76,202	20,616	67,187	9,764,700	169,280	10,679,256
TOTAL	4,204,590	76,202	83,293	433,536	36,796,637	369,655	42,000,628
7.2.2	Food	Science & Technology	Postharvest				
1990/91	1,629,291	-	19,308	17,838	2,335,037	86,612	4,088,086
1991/92	2,148,065	146,212	28,801	64,385	2,863,421	167,993	5,418,877
1992/93	807,489	161,856	4,904	21,864	2,672,687	61,658	3,730,458
1993/94	589,784	64,675	18,703	50,159	4,301,124	44,544	5,068,989
1994/95	716,920	286,433	2,507	90,378	5,359,865	27,674	6,483,777
1995/96	920,206	90,240	24,413	128,813	7,234,991	200,466	8,864,727
TOTAL	6,811,755	749,416	98,636	373,437	24,767,125	588,947	33,432,914

7.2.3 Horticulture

Kenyan FY	Educational Materials	Research	Seminars & Conferences	Transport & Travel	Personal Emoluments	Training	TOTALS
1990/91	1,614,259		18,450	84,411	2,151,734	82,762	3,951,616
1991/92	3,109,182	139,714	27,521	108,970	3,735,921	160,527	7,281,835
1992/93	913,109	154,662	4,686	42,560	4,352,171	58,917	5,526,105
1993/94	1,657,890		17,872	29,453	5,406,071	42,564	7,153,850
1994/95	3,631,801		2,395	148,247	6,270,389	26,444	10,079,276
1995/96	3,641,571	86,229	23,328	127,426	7,713,505	191,556	11,783,615
TOTAL	14,567,812	380,605	94,252	541,067	29,629,791	562,770	45,776,297
7.2-4	<u>Architecture</u>						
1990/91	198,610	4,071	19,308	-	156,161	86,612	460,691
1991/92	1,354,281	20,887	28,801	-	152,898	167,993	1,703,973
1992/93	741,989	27,852	4,904	11,997	3,405,820	61,658	4,226,368
1993/94	339,097	4,725	18,703	13,616	6,871,030	44,544	7,268,990
1994/95	510,950	20,924	2,507	34,504	9,456,626	27,674	10,032,261
1995/96	337,319	46,731	24,413	107,148	11,082,607	200,466	11,751,953
TOTAL	3,482,246	125,190	98,636	167,265	31,125,142	588,947	35,462,236

7.2.5 Civil Engineering

Kenyan FY	Educational Materials	Research	Seminars & Conferences	Transport & Travel	Personal Emoluments	Training	TOTALS
1990/91	1,319,349	-	19,308	220,380	4,238,275	86,612	5,883,924
1991/92	2,303,698	-	28,801	252,238	6,076,129	167,993	8,828,859
1992/93	555,502	-	4,904	5,678	7,039,189	61,658	7,694,783
1993/94	314,301	-	18,703	20,054	7,032,164	44,544	7,444,491
1994/95	734,301	-	2,507	42,533	9,416,673	27,674	10,223,688
1995/96	783,451	-	24,413	83,865	11,429,046	200,466	12,567,972
TOTAL	6,010,602	-	98,636	634,748	45,231,476	588,947	52,564,409
7.2.6	Electrical/ Electronic	Engineering					
1990/91	1,804,546	-	20,595	108,018	2,378,088	92,386	4,403,633
1991/92	4,136,252	-	30,721	130,696	2,431,606	179,193	6,908,468
1992/93	625,777	-	5,231	21,814	4,778,169	65,768	5,496,759
1993/94	397,141	-	19,950	38,755	5,362,927	47,513	5,866,286
1994/95	466,020	-	2,674	62,256	7,480,128	25,619	8,036,697
1995/96	1,107,564	-	26,041	32,476	10,286,768	213,830	11,666,679
TOTAL	8,537,300	-	105,212	394,015	32,717,686	624,209	42,378,522

7.2.7 Mechanical Engineering

Kenyan FY	Educational Materials	Research	Seminars & Conferences	Transport & Travel	Personal Emoluments	Training	TOTALS
1990/91	2,498,484	-	16,733	102,239	2,897,603	75,064	5,590,123
1991/92	4,020,319	-	24,961	96,717	3,327,500	145,594	7,615,091
1992/93	1,082,703	-	4,138	14,541	5,586,223	53,437	6,741,042
1993/94	775,614	-	16,210	45,580	6,391,292	38,605	7,267,301
1994/95	816,073	-	2,172	33,228	6,981,866	23,984	7,857,323
1995/96	759,271	-	21,158	18,966	9,323,936	173,737	10,297,068
TOTAL	9,952,464	-	85,372	311,271	34,508,420	510,421	45,367,948
7.2.8	Biological Sciences						
1990/91	1,651,289	-	26,927	77,472	1,118,004	120,792	2,994,484
1991/92	3,965,242	-	40,167	78,117	3,281,341	234,289	7,599,156
1992/93	1,177,695	-	6,839	20,271	5,207,817	85,990	6,498,612
1993/94	762,732	-	26,084	25,390	7,466,871	62,122	8,343,199
1994/95	1,83,8623	-	3,495	57,794	7,843,916	38,595	9,127,662
1995/96	1,719,533	65,636	34,048	68,478	8,704,064	279,576	11,161,519
TOTAL	10,460,353	65,636	137,561	327,523	33,622,013	821,365	45,724,632

7.2.9 Physical Sciences

Kenyan FY	Educational Materials	Research	Seminars & Conferences	Transport & Travel	Personal Emoluments	Training	TOTALS
1990/91	1,905,333		31,070	89,390	1,290,005	139,376	3,455,174
1991/92	4,575,278		46,347	90,136	3,786,163	270,334	8,768,258
1992/93	1,358,879		7,891	23,391	6,009,020	99,220	7,498,401
1993/94	880,075		30,098	29,297	8,615,620	71,680	9,626,770
1994/95	1,365,995		4,035	66,686	9,050,673	44,532	10,531,921
1995/96	1,525,433	285,926	39,286	79,015	10,050,673	322,589	12,302,922
TOTAL	11,610,993	285,9267	158,727	377,915	38,802,154	947,731	52,183,446
7.2.10	Mathematics	Computer	Science				
1990/91	1,047,934	-	17,088	49,164	709,503	76,656	1,900,345
1991/92	2,516,403	-	25,491	49,574	2,082,390	148,684	6,722,887
1992/93	747,384	-	4,340	12,865	3,304,960	54,570	4,124,119
1993/94	484,043	-	16,553	16,113	4,738,591	39,424	5,294,724
1994/95	751,298	-	2,218	36,676	4,977,869	24,493	5,792,554
1995/96	1,107,184	-	21,607	43,457	5,523,733	177,423	6,873,404
TOTAL	6,654,246	-	87,297	207,849	21,337,046	521,250	28,650,296

7.2.11 Institute for Human Resource Development

Kenyan FY	Educational Materials	Research	Seminars & Conferences	Transport & Travel	Personal Emoluments	Training	TOTALS
1990/91	124,964		7,723	62,945	368,966	34,642	599,240
1991/92	135,716		11,521	130,717	1,439,643	67,197	1,784,784
1992/93	48,338	64,742	1,962	10,368	3,804,530	24,663	3,954,607
1993/94	62,236		7,481	48,272	4,193,036	17,817	4,328,842
1994/95	54,323		1,003	106,695	5,098,380	11,069	5,271,470
1995/96	11,408	36,096	9,765	34,897	5,898,291	80,186	6,070,643
TOTAL	436,985	100,883	39,455	393,894	20,802,866	235,574	22,009,592
7.2.12	University	Library					
1990/91	624,108	-	20,595	40,436	2,073,791	92,386	2,851,316
1991/92	570,090	-	30,721	20,250	2,117,755	179,193	2,918,009
1992/93	433,829	-	5,231	5,243	2,994,262	65,766	3,504,331
1993/94	590,688	-	19,950	450	3,679,313	47,513	4,337,914
1994/95	421,767	-	2,674	8,375	4,022,395	29,519	4,484,730
1995/96	682,653	-	26,041	13,266	5,535,185	213,830	6,470,975
TOTAL	3,323,135	-	105,212	88,020	20,422,701	628,207	24,567,275

7.3. RESEARCH, EXTENSION & PRODUCTION DIVISION (Amounts in KShs)

7.3.1 Farm

Kenyan FY	Educational Materials	Research	Seminars & Conferences	Transport & Travel	Personal Emoluments	Training	TOTALS
1990/91	1,427,107	-	18,879	42,434	1,897,463	84,687	3,470,570
1991/92	698,776	-	28,161	153,594	2,051,365	164,260	3,096,156
1992/93	226,501	-	4,795	109,792	2,361,456	60,287	2,762,831
1993/94	72,049	-	18,288	216,826	2,450,017	43,553	2,800,733
1994/95	292,465	-	2,451	148,868	2,554,542	27,059	3,025,385
1995/96	519,829	-	23,871	80,413	2,695,128	196,011	3,515,252
TOTAL	3,236,727	-	96,445	751,927	14,009,971	575,857	18,670,927
7.3.2 Workshops							
1990/91	514,021	-	12,014	12,956	48,636	53,892	641,519
1991/92	555,196	-	17,921	57,954	176,537	104,529	912,137
1992/93	339,266	-	3,051	7,322	312,242	38,365	700,246
1993/94	189,553	-	11,638	11,531	1,297,900	27,716	1,538,338
1994/95	584,541	-	1,560	33,775	1,672,155	17,219	2,309,250
1995/96	519,829	-	15,191	27,595	2,200,603	124,734	2,887,952
TOTAL	2,702,406	-	61,375	151,133	5,708,073	366,455	8,989,442

7.4 TOTALS FOR PROJECT PERIOD (KShs)

Kenyan FY	Educational Materials	Research	Seminars & Conferences	Transport & Travel	Personal Emoluments	Training	TOTALS
1990/91	17,443,015	55,547	264,302	1,000,296	25,713,388	1,185,618	45,662,166
1991/92	30,739,443	285,926	394,256	1,359,790	37,665,685	1,869,565	72,314,665
1992/93	9,777,706	381,260	67,017	355,625	57,428,269	844,023	68,853,900
1993/94	7,546,168	64,675	256,027	590,482	73,610,501	609,754	82,677,607
1994/95	12,070,760	286,433	34,315	942,408	87,656,723	374,924	101,365,563
1995/96	14,216,522	642,699	334,191	913,002	107,777,011	2,744,150	126,627,575
TOTAL	97,793,614	1,716,540	1,350,108	5,161,603	389,851,577	7,628,034	497,481,476

CENTRAL SERVICES EXPENDITURE

TOTAL	1990/91	1991/92	1992/93	1993/94	1994/95	1995/96	TOTAL
TELEPHONE EXPENSES	983,704	1,467,963	2,327,416	2,433,623	4,217,633	3,510,039	14,940,378
ELECTRICITY	2,009,979	2,300,367	5,478,951	6,470,195	14,951,245	14,157,618	45,368,355
MAINT. OF BUILDINGS	3,203,872	1,042,167	1,325,718	2,472,519	1,437,532	1,361,166	10,842,974
MAINT. OF EQUIP./MACHINES	1,151,707	523,389	1,400,048	1,419,051	1,148,411	1,837,528	7,480,134
MAINT. OF WATER/SEWAGE	249,149	205,456	527,818	1,165,370	2,633,733	2,121,723	6,903,249
MAINT. OF GROUNDS/ROADS	120,707	64,599	31,185	37,196	27,845	10,040	291,572
A.S.K. SHOW	-	1,710,305	265,469	252,735	538,515	267,445	3,034,469
GRADUATION	1,463,919	-	594,829	552,663	2,203,943	1,423,657	6,239,011
TRANSPORT OPERATING EXP.	1,062,843	1,733,421	1,911,404	1,196,381	1,863,586	2,154,648	9,922,283
OFFICIAL ENTERTAINMENT	306,965	293,986	105,641	11,073	296,614	384,391	1,398,670
COUNCIL & COMMITTEES	-	4,374	143,078	223,513	69,352	106,568	546,885
PURCHASE OF UNIFORMS	488,681	95,783	277,323	85,853	493,745	71,389	1,482,776
ADVERTISING & PUBLICITY	1,853,463	1,031,327	1,318,395	1,129,342	1,466,831	1,375,111	9,079,469
ARREY FEES	-	-	100,000	-	450,000	-	550,000
RATES & RENT	-	67,270	-	5,640	-	874,616	947,526
PROFESSIONAL SERVICES	2,096,767	1,958,503	766,466	164,361	2,005,215	510,341	7,501,653
COMPUTER EXPENSES	247,381	294,733	261,161	391,818	714,566	659,988	2,569,644
HIRE OF TRANS./INSTR/MACH.	14,193	23,675	69,229	2,000	-	48,773	157,870

MISC AND OTHER CHARGES	43,963	192,553	447,049	2,916,798	485,077	62,372	4,147,11
FEE-ADMISSION & HON.	93,905	240,687	161,957	50,31	41,374	93,333	681,92
INSURANCE	1,742,222	1,730,843	1,046,178	1,839,069	1,293,317	3,864,988	11,516,61
INTER-UNIVERSITY GAMES	-	-	-	210,477	224,930	17,640	453,04
PURCHASE OF EQUIPMENT	3,091,067	10,630,218	1,279,344	252,926	867,707	2,333,943	18,455,20
GAS & FUEL	526,573	257,415	1,257,958	1,200,428	1,731,753	1,540,808	6,514,93
PURCHASE OF STATIONERY	825,256	608,522	898,487	871,371	681,070	837,289	7,721,99
FOOD AND RATIONS	11,593,539	1,160,984	5,494,880	10,419,144	18,161,838	7,485,575	54,315,96
NON-TEACHING STAFF SAL.	29,034,059	29,615,037	37,569,993	51,950,017	61,467,025	71,643,572	281,279,70
CLEANING MATERIALS	887,531	132,500	693,272	907,552	1,161,415	1,156,123	4,938,39
ADVANCE PAYMENTS TO CONTRA					7,000,000	73,000,000	80,000,00
TOTAL	61,066,447	58,286,077	65,753,249	88,631,136	127,634,272	122,910,681	596,281,86

GRAND TOTALS (7.4 + 7.5) 108,673,066 130,903,142 134,797,145 171,308,743 228,999,835 319,535,887 1,094,217,81

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