OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.

DISCLAIMER

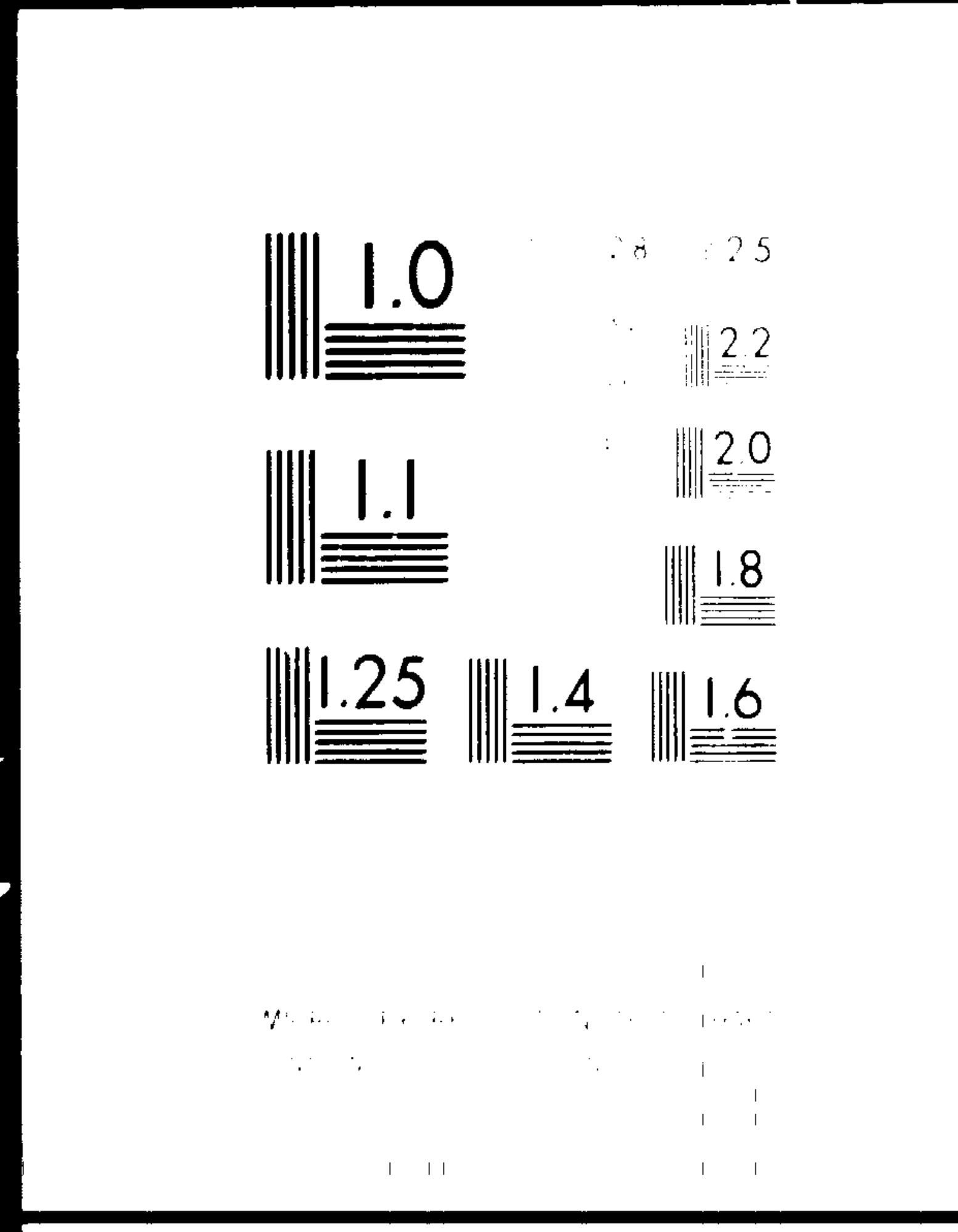
FAIR USE POLICY

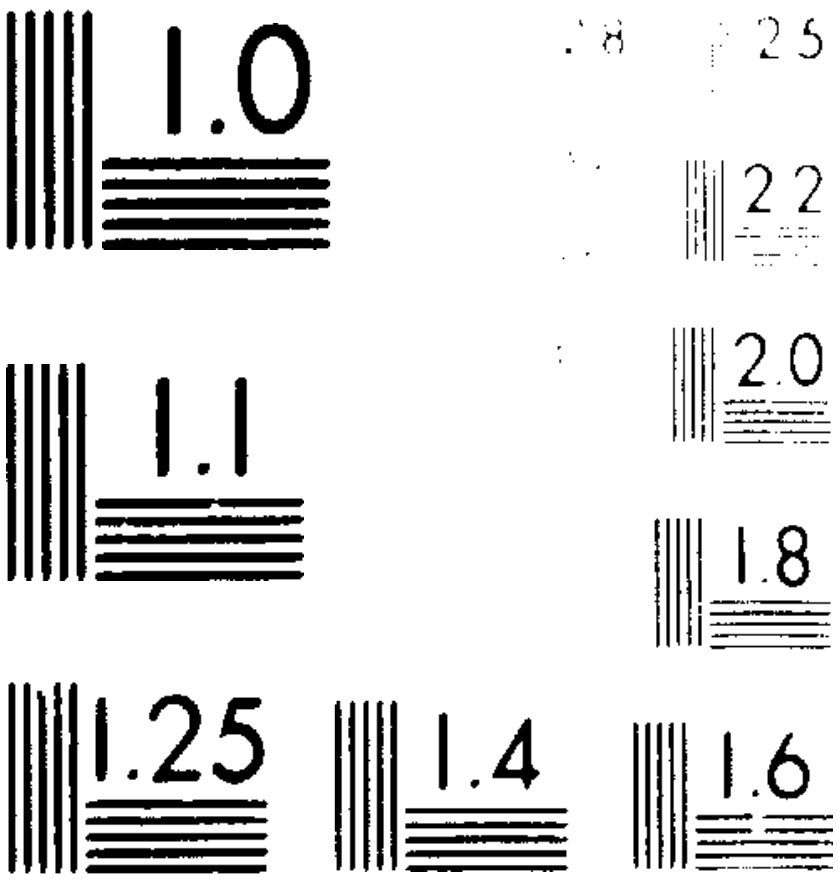
CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
Vienna International Centre, P.O. Box 300, 1400 Vienna, Austria
Tel: (+43-1) 26026-0 · www.unido.org · unido@unido.org


1.0
2.2
1.1
2.0
1.8
1.25
1.4
1.6


1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5

12251

RESTRICTED

17th March, 1982

English

ASSISTANCE TO THE INDUSTRIAL RESEARCH AND CONSULTANCY UNIT, (IRCU).

[Kenya.]

DP/KEN/75/029

KENYA

Terminal Report

Prepared for the Government of Kenya
by the United Nations Industrial Development Organization
executing agency for the United Nations Development Programme

Based on the work of Andrzej Magierski
Technical Adviser on Mechanical Engineering

United Nations Industrial Development Organization Vienna

CONTENTS

I. INTRODUCTION

Following a reasonably good growth rate during the first ten years of independence, by the mid-1970 the Kenyan economy was faced with severe problems which were caused mainly by a series of adverse circumstances, in the world economy.

It was recognised (Government's Action Programme published in 1975) that in order to sustain economic growth, reduce inflation and create employment, a broader technical services facility should be avaible to the industrial sector; this sector is second in importance in the Kenya economy only to the agricultural sector.

Consequently the Government of Kenya requested broad assistance from UNDP for the Faculty of Engineering, University of Nairobi (Draft Project Document KEN/72/013 of February 1975) in order that this body might play a central role in applied research and development work.

One of the elements of this request as finally approved (The project document signed in January 1979) was the creation of the Industrial Research and Consultancy Unit (IRCU) at Nairobi University.

The immediate objective of this project was to establish the IRCU within the Faculty of Engineering, thus enabling the University to provide technological services to the manufacturing sector in Kenya, particularly to small scale industry in both rural and urban areas.

The specific tasks for IRCU were:

1. To use its own staff to provide technical services to the industrial sector and to develop specific projects in the broad field of application of science and technology given at Appendix 1.

2. To provide "on the job" training to Kenyan staff of the IRCU and to other members of the University Community by supporting and assisting them to carry out tasks under (1) above.

3. To utilise for consultancy services some of the existing resources of the University, particularly the laboratories and workshops, as well as the expertise of academic staff, and to act as their agency.

The IRCU was then, conceived mainly a . service to industries in their bid to increase their self reliance in the Kenyan context.

The implementation plans of the IRCU project are shown in the bar chart at Appendix 2. To support these programme activities, the budget allocations shown at Appendix 3 were planned.

Ultimately, however, the actual schedule by which the programme activities were carried out differed considerably from the plans. The actual outcome of programme activities is shown in Appendix 4. The budgeting consequences for UNDP's contribution arising out of the actual scheduled project activities are shown in Appendix 5.

II. ACTIVITIES CARRIED OUT AND OUTPUTS PRODUCED

From the aspect of the contribution of the activities to the project objectives, the whole period of project implementation may be divided into two essential stages: the preparatory stage and the stage of normal IRCU activities according to the project documents.

The first stage which was to last for over 3 years, began on March 1978 with the recruitment and arrival at the duty station of UNIDO's first Technical Adviser, Mr. Lother J. Badersbach.

The activities undertaken in this stage were as follows:

- adaptation of the University premises for IRCU and procurement of the design equipment.
- establishment of the first contacts with a local industry.
- commencement of the work on the first IRCU project, the diesel engine running on biogas.
- first steps in training the IRCU staff and consultancy services.
- identification of the short term goals and IRCU strategies.

The greatest achievement of the first stage, of project implementation was undoubtedly the creation of the IRCU, mainly due to the hard and relentless work of the first UNIDO Technical Adviser Mr. Lothar J. Badersbach.

Since its inception, the Unit began establishing intensive contacts with various organizations government institutions and industry. This activity resulted in good publicity for the IRCU in making its aims and objectives better known.

The first steps were also undertaken towards industrial consultancy and training of the IRCU staff. Work on the first IRCU project, a diesel engine running on biogas, was not, however, completed during the tenure of Mr. Badersbach and has not been continued after his departure.

For more than one year after the departure of the first Technical Adviser, the IRCU was without UNDP technical assistance.

The management of the Unit at that time lay in the hands of the locally recruited Director, Mr. G.Oduwo Nyangasi, who focused his activities on the elaboration of short term goals and strategies as well as on the promotion of consultancy services by academic staff members.

The Unit had also then taken further steps towards training of the IRCU staff by way of an international fellowship (IRCU Director) and the industrial training of graduate fellows.

It should however, be mentioned that the training provided to graduate fellows did not contribute directly to development of the IRCU's manpower as they left the Unit immediately afterwards.

The most significant achievement of the IRCU's Director at that time was in my opinion the reversal of an unfavourable atmosphere and attitude of the University towards the IRCU and the establishment of a good relationship with the University authorities and community.

From the outline presented above and a short recapitulation of the first stage activities, it is quite evident that the "start up" activities foreseen in the project document to occupy 3 months were ultimately extended up to over 3 years.

Such a great extension of this stage was, predominantly to unforeseen delays like the late allocation of the Unit's accommodation, late delivery of the equipment and the late assignment of the project staff.
The accomplishment of that preparatory stage has however enabled the IRCU to start the final stage, after author arrival thus commencing normal work and meeting all the tasks foreseen in the project document.

The project activities carried out and output produced at this stage were as follows:

A. Industrial projects carried out by IRCU Staff

- Design of universal screw pres
- Design of small tracer milling machine, powered both electrically and manually.
- Design of medium capacity baking oven
- Design of hammer mill operated by electric motor
- Design of manually-operated maize mill
- Design of solar water heater

Several other industrial projects were carried out by IRCU staff in joint collaboration with the University academic staff (a detailed description of the characteristics of all of these projects are provided in my preliminary report of 20 June 1981 and progress report dated 18 November 1981).

All of these projects were either specifically requested by the small-scale industrial sector or were initiated for the benefit of rural communities.

It should, perhaps, be emphasized that they were completed in the design stage and that subsequent arrangements were made with private industrialists for the development of prototypes.
Commercial production of equipment will be undertaken after testing the prototypes.

This, in my opinion was reasonable contribution by the IRCU to the Kenyan small scale industrial sector. By demonstrating to prospective clients what the IRCU can do, it was also the bestway of enhancing Unit's reputation. As a result the IRCU was able at this stage to establish a working relationship with the private and public industrial sectors, sustained by continuously rendering effective technical services to clients.

Agreements on collaboration were also signed and close working contacts maintained with many institutions and organizations. Particularly fruitful collaboration was established with the Kenya Industrial Training Institute (KITI) and the Kenya Industrial Research and Development Institute (KIRDI) with whom joint projects are now in progress.

It should be also underlined that, as some of the above projects,when completed, were sold to industry, the Unit took the first steps towards becoming self-supporting according to the intention of the project document.

B. Training of the IRCU personnel

Three technically qualified IRCU staff members, Director Mr. G. Oduwo Nyangasi, Research Fellow Mr. J.O. Ochieng and Liaison Officer Mr. Ndoria Ngari, at this stage,underwent intensive "on the job" training. This training was carefully programmed and adjusted according to the needs and qualifications of the particular trainees.

IRCU's Director, working closely with the Technical Adviser, carried out certain projects and consultancy services for industry. By this means he developed his managerial and technical experience through the guidance and execution of different R & D works, as well as expanding his knowledge and experience of many issues of process engineering.

The Research Fellow, being engaged in the design of various equipment and the supervision of its execution at the workshop, was enabled to gain reasonable experience in designing as well as to improve his practical knowledge of engineering materials and various manufacturing processes of meta. products industry.

The Industrial Liaison Officer's training was concentrated on acquiring essential knowledge of industrial plants and typical manufacturing processes and also on projects scheduling, budgeting and marketing.

Although the training provided to the counterparts appeared, due to their hardwork and enthusiasm, to have enabled them to develop their practical knowledge and experience in many technological fields, it should neverthless realised that the "on the job" training was only conducted throughout less than 1 year and extended to only 3 IRCU staff members.

The recruitment of other personnel to the Unit, although initiated, was ultimately postponed indefinitely on account of the cash crisis the University then faced. (See Appendix 6).

C. Industrial Consultancy Services by the University Staff

The close contacts and good relationships established in the previous stage of the project execution with academic staff and authorities of the University made it possible for the IRCU to encourage and attract a reasonable number of lecturers to industrial consultancy work and effectively to promote R & D projects by academic staff members.

In particular, fruitful collaboration and working contracts were established with the Mechanical Engineering Department of the Faculty of Engineering and the Faculty of Agriculture. Owing to IRCU's continuous efforts, industrial projects and consultancy gained popularity among the lecturers and active support from the Deans of Faculties and Chairmen of Departments.

Evidence for this support is the tabling of a proposal at the latest IRCU Executive Committee meeting to set up IRCU branches at the Faculty of Agriculture and the Mechanical Engineering Department. These branches would support IRCU activities and lead to a better utilisation of the Department's resources for industrial consultancy.

In consequence, a reasonable number of staff members of these Faculties are now carrying out on behalf of the IRCU, various R & D projects. These include:

- Modification of a drug wrapping machine for a local Drugs Manufacturing Factory.
- Specialised tests on materials and soils.
- Electrolytic extraction of lead from galena.

- evaluation of a feasible study for investment in the local manufacture of plastic and ceramic products.
- Consulting services for building projects.
- Design and testing of grain processing equipment and some others.

(Detailed descriptions of the characteristcs of these projects are provided in my preliminary report dated 20 June 1981 and progress report dated 18 November 1981).

III. ACHIEVEMENT OF IMMEDIATE OBJECTIVES

Within the framework of the Project Document all project objectives have been achieved - The Industrial Research and Consultancy Unit has been established and is now running very satisfactorily fulfilling all tasks laid down in the Project Document.

It is also relevant that the UNDP assistance to the University was to be provided only for three years.

The point of view that the objectives were being accomplished was probably adopted when decision not to extend this project was taken. One essential was however neglected when taking this decision; that project implementation was seriously delayed and the training of counterparts, which was to have been provided for 3 years, was carried out within less than 1 year.

It is quite obvious that the main objective of the project, even if not expressly indicated in the Project Document, was to train the local IRCU staff to such an exten as to enable them to run the IRCU themselves after the end of the UNDP assistance. If this objective is not fulfilled the hard work put in by many persons directly and indirectly connected with the 4 years of the IRCU activities and much of the money put into project should be considered as wasted.

For the counterparts to gain adequate knowledge and experience to execute and guide industrial project independently, they should first undertake several projects under the supervision of an experienced engineer. These projects should include the full cycle of design, supervision of construction of equipment in the workshop, and its testing and correction as far as the preparation of batch production.

As the full cycle of an average industrial project implementation takes at least half a year it became clear that this condition could not have been fulfilled during IRCU's existence. The counterparts, in spite of their willingness and hard work, are therefore not yet sufficiently experienced effectively to conduct industrial project implementation and consultations by themselves.

It is therefore, imperative for the IRCU's survival to get at least 2 years further technical assistance from UNDP as soon as possible.

IV. FINDINGS

A. Scope for consultancy and development work by IRCU staff

The terms of reference given in the Project Document under the heading of output (See Appendix 1) were very broad and allowed the Unit to operate in the whole field of application of science and technology.

The wide charter given to the Unit was understood as enabling it to utilize consultancy services by academic staff members of various specializations available at the University.

When, however, activities of internal staff of the IRCU are considered, taking into account the small number of staff proposed for the Unit, a narrower field of specialization for consultancy and development work had to be chosen to make its work and "on the job" training effective.

The specialization for IRCU which I am hereby proposing is technical assistance to the small industrial sector and particularly the hardware industry in the field of equipment and process engineering for manufacturing of metal products.

This specialization is proposed after taking into account the qualifications of the IRCU staff members and after making by me a closer acquaintance with Kenyan small scale industrial sector, their problems and constraints of which some are described in Section B below.

B. Kenyan small scale industrial sector - technical assistance available and potential demand

The industrial sector in the Kenyan economy ranks second only to agriculture with contributions to G.D.P of 18% and 34% respectively. Furthermore, it provides employment to a significant percentage of wage earners and is also the producer of essential goods and services for agriculture.

Therefore in the present policy climate for developing Kenyan agriculture, it should be realized that two thirds of the country has inadequate annual rainfall for production of food stuffs and cash crops. There is, therefore, a need to diversify the sources of earnings particularly for the rural population by introducing small scale industries into the rural areas.

To foster industrial development, the Government of Kenya has established a network of institutions. These include Kenya Industrial Estates (KIE). National Council for Science and Technology, Industrial Research and Development Institute, Kenya Industrial Training Institute and others.

Among these Institutions, only KIE is immediately involved with giving support and assistance to the small industrial sector. This is largely achieved through industrial estates established in the larger urban centres by offering to indigenous businessmen organizational, financial and technical assistance in settling up and running their enterprises.

The following paragraphs examine what kind of technical assistance may be needed by a private entrepreneur who has come to the KIE with the idea of starting production of a specific product and what technical assistance he can get there.

Technical assistance needed

The process of preparation for production of a new product (hardware) should comprise at least the following stages:

- Production design
- Elaboration of manufacturing processes to be used
- Determination and selection of standard (Commercial) equipment and tooling
- Design and execution of special tooling

Production design

Product design and provision of the part prints is supposed to be the most important technical assistance needed by prospective industrialists as it determines the product function and durability, manufacturing processes tobe used, cost of production and maintenance, customer acceptance etc.

It should be borne in mind at this stage that commercial businesses and manufacturing industries in this country are largely unregulated. In this connection much competition by industrialists is expected and only those who start with cheaper production of better products than those available in the market have a real chance for survival. The nature and technical level of assistance offered to industrialists at the stage of product design therefore often determines the fate of the whole business venture.

Elaboration of manufacturing processes to be used

The process selection as well as operations lineup and their parameters must be an economical balance of materials, manpower, product design, tooling and equipment, workshop space and many other factors influencing cost and practicability.

An accurate analysis of all the factors necessary for consideration in selecting the best process of manufacture is not easily achieved and requires highly qualified technical assistance.

Statements are often made to the effect that there is already sufficient technology in industrialised countries for use by developing countries. This, however, is not valid since products and their technology from the developed world, even if available, are adjusted to capital-intensive large scale production and are thus unsuited for copying.

It is also unrealistic to expect the Research Institutes or Universities to deliver turn-key projects in the shape of products or technology ready for production. To do so requires more specialized know-how than is usually available there, or that its achevement would use too much of their capacity.

Determination and selection of standard (commercial) equipment and tooling

This kind of technical assistance is usually available from the equipment and tooling producers who select the equipment on the basis of the product drawings and processes operations routing.

Design and execution of special tooling

Frequently even in the case of a unit or small scale production of a relatively simple product, special tooling is required in the shape of tools, dies moulds, workpiece holders etc. In most cases greater skills of the designer and builder engineer are neccesary to design and make such tooling.

2. Technical assistance provided

Unfortunately, neither of the above categories of technical assistance are available to entreprenuers in industrial estates excepting to some extent only, Nairobi Industrial Estate. This has a nucleus design office capable of designing some types of special tooling and of producing them in the workshop.

Most of the other industrial estates I had the opportunity to visit have relatively well equipped workshops. They are however not backed by any specialized unit or staff capable of working out a design of instrumentation and its technology. They therefore could not utilize their facilities even to provide that limited technical assistance offered to the industrialists by Nairobi Industrial Estate.

At the same time it should be borne in mind that, apart from enterprises established within the industrial estates, there are also many so-called informal units dispersed throughout the country which so far have no access to any technical assistance.

As a result of the deficiency of highly qualified technical assistance to small scale industry, many private entrepreneurs, instead of developing production and earning revenue needed to repay the loans taken to establish their enterprises, have required continuously subsidy by KIE.

One of the entrepreneurs that was visited, for instance, had about ten precision automatic lathes but was engaged in the production of simple manually-made garden gates

3. Shortage of qualified personnel

The deficiency of the technical assistance available in Kenya to small scale industry is certainly caused in part by the absence or inadequacy of well-trained professional staff.

Newly qualified University graduates, although having an academic background, have a rather limited ability to handle problems of an industrial nature. There is therefore an urgent need to have a consistent and effective policy on development and upgrading University leavers to enable them to handle specific tasks for industry in the shortest possible time.

As technological and design skills can only be acquired through "on the job" training that permits experimentation, adaptation and innovation, the best solution in this case would be that new graduates should undertake obligatory training held in high standard industrial plants and/or specialized technological and design offices. Under the guidance and supervision of experienced staff they would there solve specific problems for industry.

Unfortunately in Kenya to date there are only a few places capable of ensuring an adequate level of postgraduate industrial training. In this connection, training abroad in the shape of scholarships and/or fellowships remains in most cases the only alternative available.

As the opportunities of getting training abroad are not plentiful, it is imperative to utilize them in the most effective way when and where they become available.

One solution would be to couple training abroad with the execution of specific technical projects appropriate to the needs of a country, with the additional obligation that after completion of training the candidate should produce technical documentation instead of written report.

4. Conclusions

The general conclusion to be drawn from the preceding discussion is that industrial consultancy services constitute a vital component in the infrastructure required for self sustaining industrial development.

The lack of adequate technical assistance to the industrial sector as well as the shortage of postgraduate training facilities seems to be a major obstacles to industrialization of this country.

This argues strongly for the development of the IRCU - following the recommendation of the projects document - into a major engineering centre. It also suggests that, on the IRCU model, a broad network of specialised design - technological units should be set up. These would be manned by technically highly qualified and experienced personnel. The job to be performed would comprise the following:-

- To provide technical assistance to the private and public industrial sectors with the scope as outlined in section 1.
- To ensure the industrial training of local personnel, especially recent University graduates; and
- to act as an intermediary between University and/or Research Institutes and the manufacturing sector by preparing the results of R & D for industrial production.

At the outset it might appear that establishing and running such a wide network of consultancy units would be an expensive exercise. However, when-one considers the expenditure currently incurred on foreign industrial consultancies and for the continuous financing of unremunerative enterprises, the benefits of such a venture will be clearly visible.

C. The Problem of Utilization of the University Resources

A number of projects (see section IC) carried out by academic staff as a result of the IRCU's solicitation have proved that some of the University's lecturers have adequate industrial experience to render effective industrial consultancy services.

Most of the academic staff members, certainly have good enough qualificat' and expertise to conduct more sophisticated projects and/or to utilize the University facilities to carry out technical services in the field or chemical analysis, physical testing of materials and products, and so on.

In spite of continuous efforts made by the IRCU and its unquestionable achievements in this field, it should be realised that University resources have so far not been fully exploited for technical services to the Kenyan industrial sector.

It should also be borne in mind that the effective utilization of academic staff and other University facilities for industrial serivices and development work is not exclusively a problem of the IRCU or even of Kenya as it has not been satisfactorily solved in any country of the world.

It is relatively easy to conduct R & D projects by academic staff members in the laboratories. The problem arises when the University attempts to commercialize, i.e. to apply the results since in most cases the academic staff do not have the capability to prepare the R & D results to the stage ready for industrial utilization.

Thus, R & D by the University staff without further technical and/or industrial assistance will have not commercial relevance. To try to solve this problem in the University of Nairobi I would propose to charge the IRCU with the additional role of an intermediate body preparing R & D findings by academic staff for industrial implementation.

That would of course firstly require enhancing IRCU's manpower. The shortage of personnel is in general the main constraint now faced by the IRCU, particularly when its activities as an agency of the academic staff members is considered.

Having only a few emplyees it is impossible for the IRCU to act effectively as an agency of the whole University, which employs several hundred lecturers dealing with many technical and scientific fields.

As the problem of IRCU manpower is unlikely to be solved quickly I would propose in this case for better utilization of the University resources to follow up the example of the Mechanical Engineering Department and Agricultural Faculty by setting up similar IRCU branches in other Faculties and Departments of the University.

The next thing that is seriously hampering the academic staff activities in industrial consultancy is the lack of special fund for supporting them financially during project execution.

Te need for such support is evident. Payment for a project is in most cases available not until preliminary work has been done and the industry is convinced that the project is viable.

In the case of projects whose assistance is to be requested from a funding organization, the preliminary work and concomitant expenditure are necessary in preparing a viable proposal.

D. Problems of new and renewable sources of engery

During recent years the Government of Kenya and many international funding organizations have been investing considerable amounts of work and money in the development of projects related to the utilizations of new and renewable energy sources.

These activities were given much more publicity during the UN conference on this matter which took place in Nairobi in August 1981.

The list under the heading "New and Renewable Sources of Energy"includes:-

(1) "New": peat oil shale/tar sands, geothermal

(2) Renewable: direct solar energy: wind, ocean energy (including wave, thermal gradents and hydro).

From this list only hydro energy (including mini and micro hydro) may be considered as a mature technology which has been proved viable technically and/or economically in industrialised countries, thus having a chance to be adapted sucessfully in developing countries.

The other energy sources, including those which are mot popular in Kenya such as biogas, wind and solar energy, and in the development of the equipment for which IRCU was involved, have not been yet proved competitive with traditional energy sources. Efforts made to develop them in third world countries at present are in my opinion doomed for failure.

V RECOMMENDATIONS

1) Taking into account:

- the 3 year delay in project implementation, and the consequent fact that on-the job training for counterparts was too short and insufficient;
- the importance of units such as the IRCU in the infrastructure necessary to sustain the growth of the Kenyan economy; and
- the urgent need for the development of the IRCU with a major engineering centre, according to the requirements of the project document:

UNIDO/UNDP should provide, as soon as possible, at least 2 more years technical and financial assistance to the Industrial Research and Consultancy Unit at the Faculty of Engineering of the University of Nairobi.

2) Taking into account the lack of adequate technical assistance to the industrial sector and the shortage of post-graduate training facilities which are now a major source of obstacles to industrialization of this country.

THE GOVERNMENT OF KENYA should take adequate steps to develop the IRCU and turn it into a major engineering centre. In addition, following the example of the IRCU, it should set up a broad network of specialized design-technological units manned by technically highly qualified and experienced personnel with tasks as follows:-

a, to provide technical assistance to the private and public industrial sectors, particularly in the field of equipment design and process engineering for manufacturing.

b, to ensure the industrial training of local personnel, especially newly-qualified University graduates; and

c, to act as an intermediary body between University and/or Research Institutes and the manufacturing sector by preparing the results of R & D projects for industrial applications.

3) For better utilisation of University resources, particularly the academic staff members industrial consultancy and development work and to enhance the IRCU activities in this field the University ought to:-

a, enlarge the number of IRCU staff members and/or set up IRCU branches in most of the relevant Faculties and Departments of the University.

b, Create a special fund to cover academic staff members' expenditure needed for project execution and implementation until reimbursement for the projects is available from the clients.

Appendix 1

TERMS OF REFERENCE - (EXPECTED OUTPUTS OF IRCU).

1. More appropriate technoligies for several small-scale manufacturing processes (mechanical, electrical, chemical, food processing, furniture, etc).

2. Prototype of agricultural implements and equipments.

3. Prototypes of equipment and processes utilising solar, wind, water, geothermal, chemical (e.g., methane and alcohol) and other sources of energy.

4. Design of low cost buildings using local materials, including design of farm structures.

5. New uses of local materials (bentonite, pumice, soapstone, sisal etc).

6. Prototype equipment for water raising, storing and transporting.

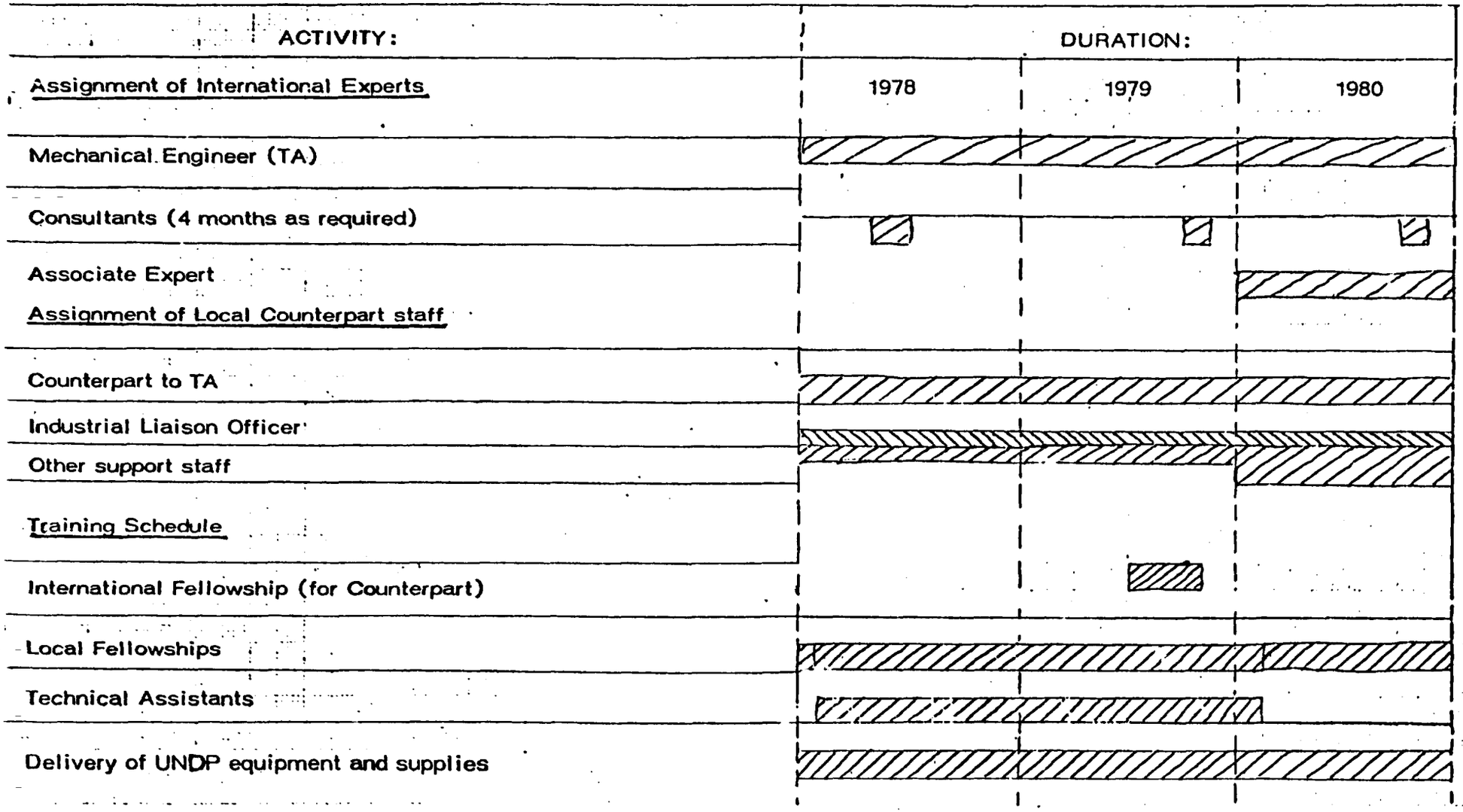
7. Development of local arts and crafts (wood-carving, textiles, ceramics, etc).

8. Studies of production methods in various industries using alternative levels of technology.

9. Provision of specialised testing services.

Appendix 2

ORIGINAL PROGRAMME OF ACTIVITIES (IRCU).



Appendix 3

Project Budget Covering Government Contribution in Kind
(in local currency)

Country: Kenya
Project No: KEN/75/029/A/01/37
Title: Assistance to Industrial Research and Consultancy Unit

		Total		1978		1979*		1980*	
		m/m	K£	m/m	K£	m/m	K£	m/m	K£
10.	PROJECT PERSONNEL COMPONENT								
	Professional Staff								
	Director	36	21 00	12	7000	12	7000	12	7000
	Industrial Liaison Officer	36	800	12	2800	12	2800	12	2800
	Sub-total	72	29400	24	9800	24	9800	24	9800
	Other Staff								
	Senior Clerical, Administrative and Technical staff	120	24000	24	4800	36	7200	60	12000
	Ancillary Staff	60	5000	12	1000	24	2000	24	2000
	Sub-total	180	29000	36	5800	60	9200	84	14000
15.			210		70		70		70
19.	Component Total	252	58610	60	15670	84	19070	108	23870
30.	TRAINING								
31	Technical Assistants	48		11		24		13	
39.	Component Total	48	6000	11	1375	24	3000	13	1625
40.	EQUIPMENT								
41.42.	Expendable and non-expendable		12000		3500		4000		4500
43.	Premises - capital expenditure		10000		3000		3500		3500
49.	Component Total		22000		6500		7500		8000
50.	MISCELLANEOUS		6000		2000		2000		2000
99.	GOVERNMENT TOTAL CONTRIBUTION		22010		35345		41370		45295

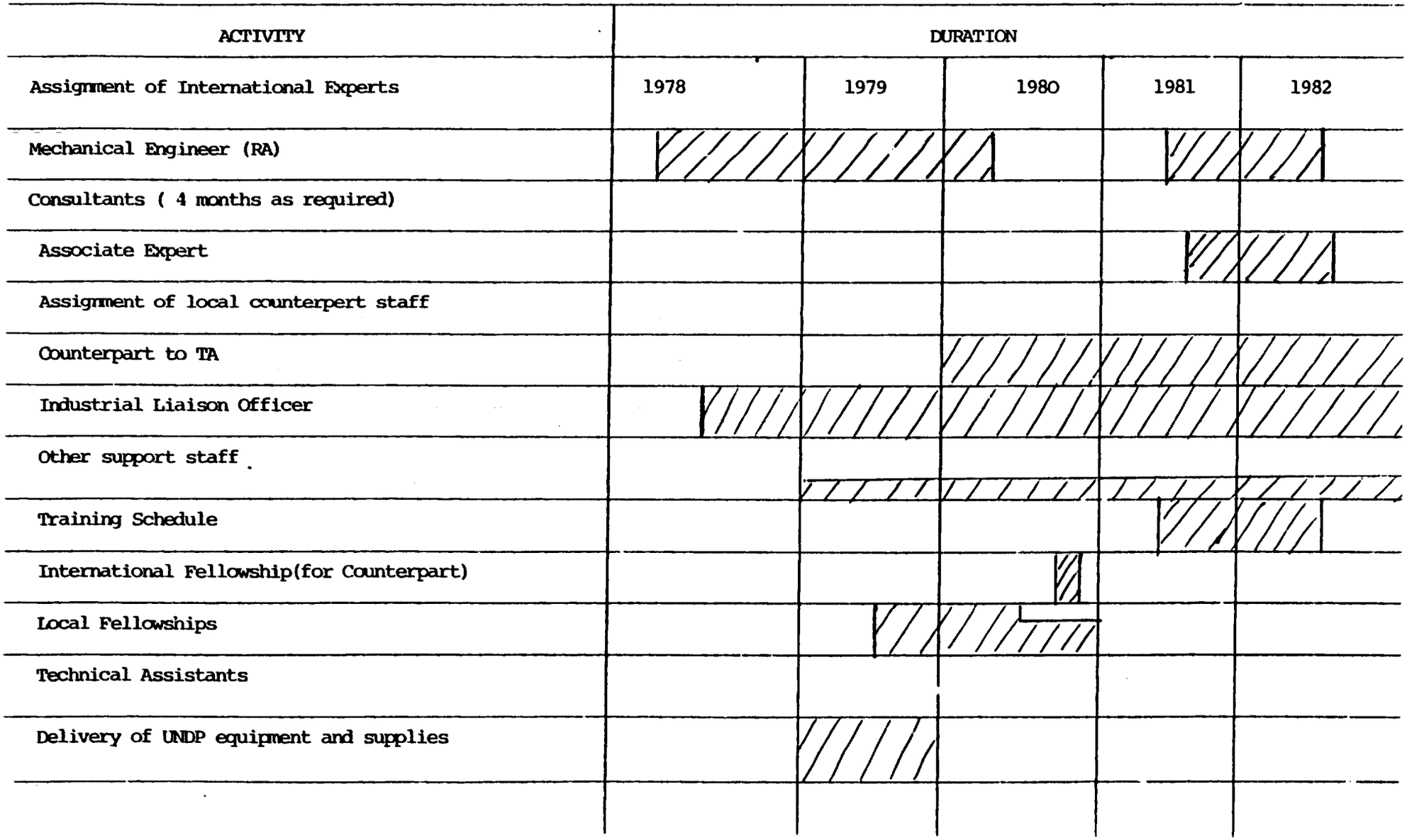
* No annual requirement have yet been taken into account for 1979 and 1980

Project Budget Covering UNDP Contribution
(in US dollars)

		TOTAL	1978	1979	1980	19__	19__
12-01	OPAS Expert						
12-02							
12-99	Subtotal						
13	Administrative Support Personnel						
14	Volunteers						
15	Official Travel	6,000	2,100	1,950	1,950		
16	Other Costs						
19	Component total	204,800	66,100	66,750	71,950		
29	SUBCONTRACT						
30	TRAINING						
31	Individual Fellowships	5,200		5,200			
32	Group Training						
33	In-Service Training	48,600	16,200	16,200	16,200		
39	Component total	53,800	16,200	21,400	16,200		
49	EQUIPMENT	54,000	26,000	15,000	13,000		
59	Miscellaneous	12,250	3,000	5,250	4,000		
90	Subtotal	324,850	111,300	108,400	105,150		
97	Cost-Sharing						
99	UNDP Total Contribution	324,850	111,300	108,400	105,150		

APENDIX 4

ACTUAL PROGRAMME IMPLEMENTATION (IRCU) 1978-82



Appendix 5

TRY	4. PROJECT NUMBER AND AMEND.	5. SPECIFIC ACTIVITY
KENYA	DP/KEN/75/029/ H/01/37	31.3.J

ECT TITLE
Assistance to Industrial Research and Consultancy Unit

PROJECT PERSONNEL EXPERTS / Post title	16. TOTAL		17. 1977		18. 1978		19. 1979		20. 1980	
	m/m	$	m/m	$	m/m	$	m/m	$	m/m	$
Mechanical Engineer	38.8	213,767			10.1	49,014	12	64,993	4.7	28,160
Consultant	3.5	21,700								
SUBTOTAL:		231,107			10.1	49,014	12	64,993	4.7	28,160

EKS

CT NUMBER DP/KEN/75/029/A/01/37	16. TOTAL		17. 1977		18. 1978		19. 1979		20. 19	
	m/m	$	m/m	$	m/m	$	m/m	$	m/m	
2.01 OPAS Experts										
3.00 Support Personnel										
4.00 Volunteers										
5.00 Experts Travel		6,288				431		3,253		
6.00 Other Personnel Costs		9,368				1,925		413		2,0
7.01 Locally hired Experts										
7.02 Locally hired Experts										
9.00 Total Personnel Component		251,123				51,370		68,659		30,3
SUBCONTRACTS										
3.00 Total Subcontracts Component										
TRAINING										
1.00 Fellowships		7,233								4,7
2.00 Study Tours, UNDP G. Training/Meetings										
3.00 In-service Training		47,859						7,007		37,3
4.00 Group Training (non-UNDP)										
5.00 Meetings/Consultations (non-UNDP)										
9.00 Total Training Component		55,092						7,007		42,0
EQUIPMENT										
9.00 Total Equipment Component		65,636		5,500		3,837		28,797		8,7
MISCELLANEOUS										
1.00 Operations — Maintenance		11,329				224		3,429		2,1
2.00 Reports		1,000								
3.00 Sundries		8,752				628		4,364		7
5.00 Hospitality (non-UNDP)										
9.00 Total Miscellaneous Component		21,081				852		7,793		2,9
GRAND TOTAL:		392,932		5,500		56,059		112,256		84,1

UNIDO

PROJECT BUDGET/REVISION

3. COUNTRY	4. PROJECT NUMBER AND AMEND.	5. SPECIFIC ACTIVITY
KENYA	DP/KEN/75/029/H/01/37	31.3.J

6. PROJECT TITLE

Assistance to Industrial Research and Consultancy Unit

15. 10. PROJECT PERSONNEL EXPERTS / Post title	16. TOTAL m/m	16. TOTAL $	17. 1981 m/m	17. 1981 $	18. 1982 m/m	18. 1982 $	19. m/m	19. $	20. m/m
11									
11-01 Mechanical Engineer	12	71,600	8	46,400	4	25,200			
02									
11-50 Consultant	3.5	21,700	1.5	9,100	2	12,600			
04									
05									
06									
07									
08									
09									
10									
11									
12									

PROJECT BUDGET/REVISION

2. PAD NUMBER

PROJECT NUMBER DP/KEN/75/029/H/01/37	16. TOTAL		17. 1981		18. 1982		19.		20.
	m/m	$	m/m	$	m/m	$	m/m	$	m/m
12.01 CPAS Experts									
13.00 Support Personnel									
14.00 Volunteers									
15.00 Experts Travel				1,500		900			
16.00 Other Personnel Costs				2,500		2,500			
17.01 Locally hired Experts									
17.02 Locally hired Experts									
19.00 Total Personnel Component				59,500		41,200			
SUBCONTRACTS									
29.00 Total Subcontracts Component									
TRAINING									
31.00 Fellowships				2,500					
32.00 Study Tours, UNDP G. Training/Meetings									
33.00 In-service Training				3,500					
34.00 Group Training (non-UNDP)									
35.00 Meetings/Consultations (non-UNDP)									
39.00 Total Training Component				6,000					
EQUIPMENT									
49.00 Total Equipment Component				16,000		2,723			
MISCELLANEOUS									
51.00 Operations — Maintenance				3,500		2,000			
52.00 Reports						1,000			
53.00 Sundries				2,000		1,000			
55.00 Hospitality (non-UNDP)									
59.00 Total Miscellaneous Component				5,500		4,000			
GRAND TOTAL:				87,000		47,923			

Kenya ENGINEER

JAN/FEB 1982

CONTENTS

COVER PICTURE: The search for oil has been pursued in Kenya for many years. After abandoning exploration on land, an international consortium is now working offshore near Malindi. "Seacrest" is the base ship for the operation.

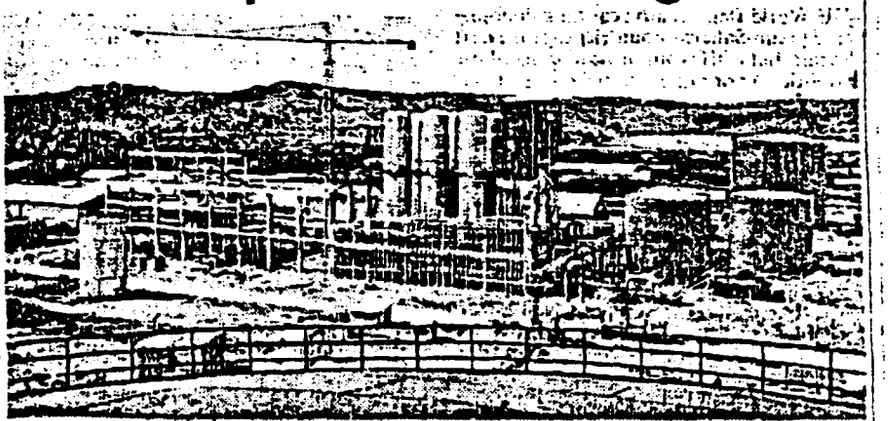
Published by News Publishers Ltd., Norwich Union Building, P.O. Box 30339, Nairobi for the Institution of Engineers of Kenya, registered office: MOW Building, P.O. Box 41346, Nairobi.

Printed by New World Printers Ltd., Lusaka Road, P.O. Box 41869, Nairobi

Kenya Engineer is published every two months for engineers working and studying in Kenya. Views expressed in this journal are those of the writers and do not necessarily reflect the views of the Institution.

Kenya Engineer welcomes articles and photographs for consideration.

Kisumu power alcohol plant reaches production stage



The Kisumu power alcohol plant is fast nearing completion. This picture was taken from the top of one of the huge methane tanks, part of the giant complex.

KENYA Chemical & Food Corporation's controversial power alcohol plant in Kisumu could start production in January if enough cash is injected into the project's last stages.

As KE went to press, the corporation was Shs 90M short, although general manager Shiv Sharma said: 'We are quite hopeful'.

Altogether the project is running some 21 months behind the initial programme envisaged in 1977 (KE Sep/Oct 1980). But delays in obtaining land and failure of the first civil contractor quickly dashed those hopes and completion target was pushed back to July 1981.

But again this year the project was hit by more delays, this time caused by a cash flow crisis which virtually brought the site to a standstill between May and September. During that time civils contractor Soiel Boneh's work force was cut from about 800 to just 120, says Sharma.

He blames lack of co-ordination among the plant's three owners for the delays in completing formalities to get cash released from the banks.

The unhappy history of this project is reflected in the huge cost escalation. Initial estimates priced the installation, which not only produces alcohol but other commercially valuable byproducts, at Shs 600M. Now the figure is Shs 1,050M. Of this increase some Shs 200M is attributed to the decline of shilling against the Swiss franc. Swiss component of the plant is worth Francs 122M.

A further Shs 120M arose through inclusion of items not originally planned such as an oxygen plant, water treatment facilities, etc. And on top of that has been the cost of inflation.

Even with the 20M litres/year ethanol plant in operation, units for production of citric acid, yeast and vinegar are under construction.

The plant was designed by the Swiss firm, Process Engineering under a turnkey contract. It is owned by a joint venture of Chemfood Investments, Advait International and the government, which has a 51% share. Civil construction is by Soiel Boneh International and plant erection is by Deweto International.

Cash crisis hits University

NAIROBI University's engineering faculty is likely to lose up to eight of its best potential research students as a result of the cuts in government-funded scholarships.

Normally the University gets 40-50 scholarships out of which the engineering faculty is allocated eight. But for the academic year starting 30 November only three scholarships will be available for the whole University.

'The University is in a financial mess', Professor Alfred Otieno, dean of the engineering faculty, told KE. 'The government gives us money some of which is allocated for postgraduate scholarships. But, because we are in this mess, the money has been spent on other things like feeding the undergraduates.'

Otieno fears the brightest students will suffer most: 'The chaps who get these scholarships are the best. They will probably go and work and maybe get sponsored later', he said.

The academic year started late as a result of the two-month closure early in 1980. Despite the interruption, students appear to have done well in the end-of-year exams in September. 'We are surprised they did so well' admits the dean.

Intake of Faculty of Engineering

A TOTAL of 209 students were admitted to the Faculty of Engineering at the University of Nairobi for the year 1981/82.

The numbers admitted to the various departments were as under:

Civil:	69
Electrical:	55
Mechanical:	46
Surveying and Photogrammetry:	21
Agricultural Engineering:	18

Ten of the students are from Uganda Botswana and Lesotho.