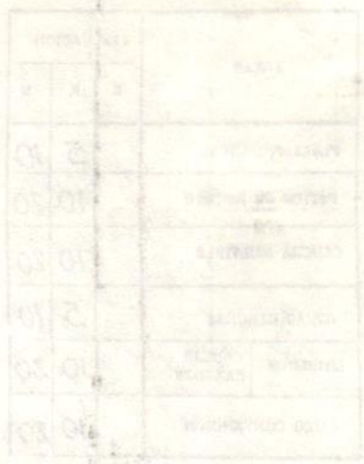
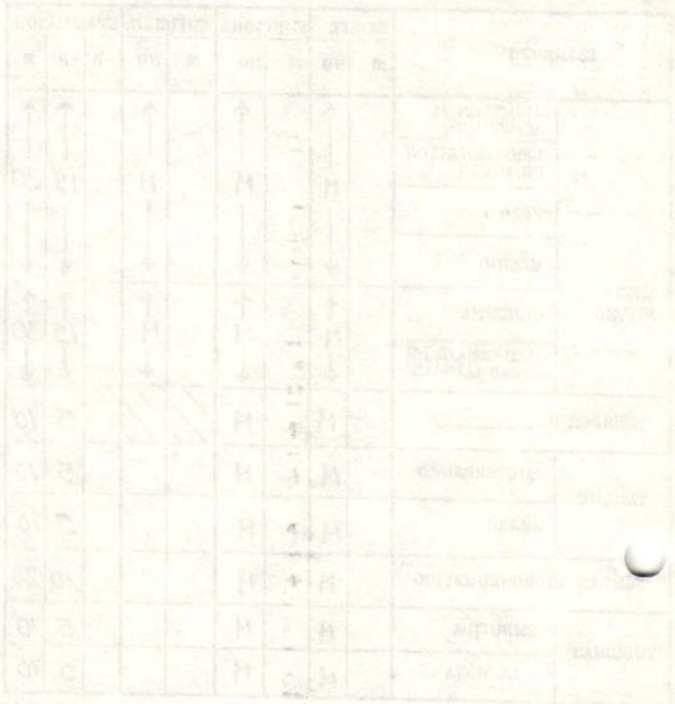




.- CARACTERISTICAS CONSTRUCTIVAS DEL EDIFICIO.

ELEMENTO		B	R	M
COLUMNAS			5	10
VIGAS			5	10
LOSAS	ENTREPISO		↑ 5 ↓	↑ 10 ↓
	TECHO			
PARES (VIGUETAS)			5	10
MURO PORTANTE			5	10
ESCALERA			5	10

.- SITUACION ACTUAL DE LA CUBIERTA

ELEMENTO		EVALUACION B	R	M
LIVIANA	LAMINA METALICA/OTRO.		5	10
IMPERMEABILIZACION			5	10
RECUBRIMIENTO	TEJAS/TABILLAS		5	10
PENDIENTES			5	10

20/40 40/40

.- ARQUITECTURA SITUACION ACTUAL

ELEMENTO		EVALUACION B	R	M
PISOS	EXTERIOR		5	10
	INTERIOR		5	10
PAREDES	EXTERIOR		5	10
	INTERIOR		5	10
TABIQUES	SANITARIOS		5	10
	OTRO ____		5	10
VENTANAS			5	10
BLOQUES DE VENTILACION			5	10
PUERTAS			5	10
REJAS	PUERTAS		5	10
	VENTANAS		5	10

55/110 110/110

.- RECUBRIMIENTOS SITUACION ACTUAL

	ELEMENTO	EXTERNO B	R	M	INTERNO B	R	M
PISOS	PAREDES		5	10		5	10
	TECHOS		5	10		5	10
	ESTRUCTURA		5	10		5	10
PORCELANA	PAREDES		5	10		5	10
	PISOS		5	10		5	10
	ESTRUCTURA		5	10		5	10
PINTURA	PAREDES		5	10		5	10
	TABIQUES		5	10		5	10
	TECHOS		5	10		5	10
	ESTRUCTURA		5	10		5	10
	VENTANAS		5	10		5	10
	BLOQUES VENTILACION		5	10		5	10
	PUERTAS		5	10		5	10
	REJAS		5	10		5	10

140/280 280/280

.- CONDICIONES DE CONFORT

ILUMINACION B[ ] M[X] 10

VENTILACION B[ ] M[X] 10/20/20

.- CONDICIONES DE SEGURIDAD

LOS PASILLOS ESTAN CUBIERTOS SI[ ] NO[X] 10

LAS PUERTAS OBSTACULIZAN LA CIRCULACION EN PASILLOS SI[X] NO[ ] 10

LOS PASAMANOS ESTAN B[ ] R[X] M[X]

LOS ESCALONES ESTAN B[ ] R[X] M[X] 5/10

.- EXISTEN DISPOSITIVOS DE EMERGENCIA SI[ ] NO[X]

DISPOSITIVOS DE EMERGENCIA	EXISTE SI	NO	FUNCIONA SI	NO	EVALUACION B	R	B
MANGUERA CONTRA INCENDIO		M		M		5	10
EXTINTOR		M		M		5	10
LUCES DE EMERGENCIA		M		M		5	10
OTRO_____		M		M		5	10

10/80 80/80

.- INSTALACIONES ELECTRICAS. SITUACION ACTUAL

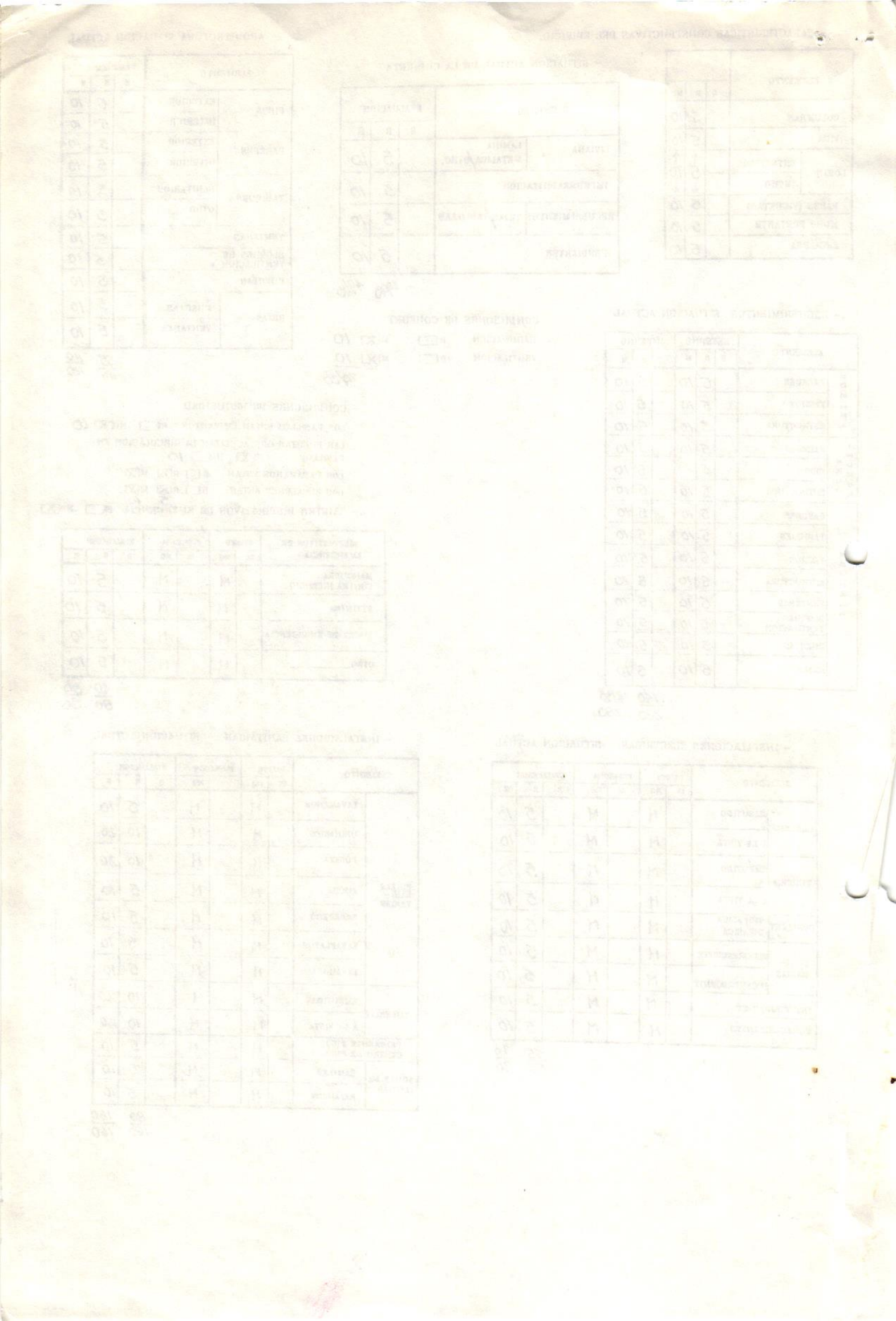
ELEMENTO		EXISTE SI	NO	FUNCIONA SI	NO	EVALUACION B	R	B
CABLEADO	EMBUTIDO		M		M		5	10
	A LA VISTA		M		M		5	10
TUBERIA	EMBUTIDO		M		M		5	10
	A LA VISTA		M		M		5	10
CORRIENTE	TRIFASICA		M		M		5	10
	BIFASICA							
LUMINARIAS	FLUORESCENTE		M		M		5	10
	INCANDESCENTE		M		M		5	10
INTERRUPTORES			M		M		5	10
TOMACORRIENTES			M		M		5	10

15/90 90/90

.- INSTALACIONES SANITARIAS . SITUACION ACTUAL

ELEMENTO		EXISTE SI	NO	FUNCIONA SI	NO	EVALUACION B	R	B
PIEZAS SANITARIAS	LAVAMANOS		M		M		5	10
	URINARIOS		M		M		10	20
	POCETA		M		M		10	20
	DUCHA		M		M		5	10
	BEBEDERO		M		M		5	10
	LAVAPLATOS		M		M		5	10
	LAVAMOPAS		M		M		5	10
TUBERIAS	EMBUTIDAS		M		M		10	20
	A LA VISTA		M		M		10	20
PENDIENTE PISO CENTRO DE PISO			M		M		5	10
AGUAS DE LLUVIAS	CANALES		M		M		5	10
	BAJANTES		M		M		5	10

80/160 160/160



The University in a Developing Country

John M. Dubbey

INTRODUCTION

In many ways the tasks required of the University of Malawi are similar to those of any other higher educational institution; the University recruits and graduates students in a variety of subject areas, and it researches in most of these fields. In other ways, the challenge, the motivation and direction can be quite different. While acknowledging the similarities and the consequent ability to draw upon experience gained in British institutions, it is my purpose in this article to concentrate on the differences and to indicate the particular responsibilities and opportunities of a university in a developing country. The argument will be developed that this type of requirement provides a legitimate and academically stimulating alternative to the temptation to simply follow the pattern of traditional universities. The illustrations are, naturally, taken mostly from Malawi, but it is considered that the emphases are general enough to contain a wider applicability.

BACKGROUND

For comparative purposes, it will be necessary to offer a brief introduction to the University of Malawi. When it was founded at Independence in 1964, a major structural decision was made which has had most interesting consequences. In contrast to Britain, which at that time was formalizing the binary system, and several neighbouring African countries which introduced a hierarchy of higher educational institutions, Malawi opted for an umbrella system in which the University embraced all national colleges of higher education. These included Chancellor College, now in Zomba, and the largest of the components with Faculties of Humanities, Science, Social Science, Education, Law and Public Administration: the Polytechnic in Blantyre, focusing mainly on Engineering and Commerce, the Bunda College of Agriculture and Kamuzu College of Nursing, both in Lilongwe, the capital city. There are, it must be admitted, practical problems in operating on sites as much as 200 miles apart, but the general principle has proved to be most successful and I am currently persuading at least one neighbouring University to rectify the mistake of its initial structure and adopt the Malawian pattern.

BENEFITS

The major advantages which have followed this alignment are that there has never been any problem about parity of esteem since all Colleges offer university degrees and diplomas. There is a pronounced vocation bias, and there is healthy competition through the selection process. While some countries still worry about the science/arts ratio, in Malawi at least 85 per cent of students are in specific vocational areas leading to good employment prospects. With this sort of ratio, the University is still able to produce enough poets, philosophers, historians and sociologists, but not in disproportionate numbers. If it were possible to expand the University and (as will be argued) this is a major aim, the ratio will be maintained.

Applicants to the University have passed the Malawi Certificate of Education (cross-moderated with AEB — African Examination Board), equivalent to the British O level, and take four or five years to a degree with an additional year to honours. Selection is made on merit, and it is current experience that the Polytechnic is attracting the best students into the Engineering and Business Studies programmes. This type of choice is made possible by giving the Polytechnic equal status to the other Colleges, and these in turn are challenged to improve their curricula and vocational prospects in order to compete for the better students.

With this introduction to provide a background to the illustration, I offer the following indicative features of the particular challenges facing this type of university.

PARTICIPATION IN NATIONAL DEVELOPMENT

Participation in national development must, I believe, be a major responsibility for a national university. Many universities were initiated to provide graduates and diplomates in appropriate areas in significant numbers for the immediate needs of national development. The concept not only provides a motivation for having a university at all, but also offers a natural wealth of opportunities for pure and applied research, consultancy and curriculum development. The problems to be solved in all sectors pose an intellectural challenge at least as great as any of those offered in traditional academic disciplines. There can be no fear of dilution of intellectual standards by relating the thrust of the university to the challenges of national development. Further, in most cases the university has the greatest depth and diversity of human ability to be found anywhere in the country. In Malawi, one can estimate that at least two-thirds of PhD holders in the country work for the University. This concentration of human resource can potentially be mobilized for the benefit of the nation. It is encouraging that government and parastatal bodies are already looking to the University for consultant expertise rather than seeking expensive and not always productive help from Europe or America, and that private companies are beginning to contract their entire training programmes to the University.

The Malawian Government has recently announced a 10-year development plan, and in each of the component sections — Agriculture, Animal Husbandry, Forestry, Fisheries, Minerals, Commerce and Industry, Trade and Finance, Construction and Civil Engineering, Energy, Wildlife, Tourism, Health, Housing, Mining, etc. — staff from the University will work with counterparts in the public and private sectors to extend and implement the programmes. The University will also continue to make mutually beneficial contracts with private companies as a major national provider of research, consultancy, training, testing and advisory services. In turn, through well developed policies on research, consultancy and short courses, the University will benefit financially, both to diversify its financial base with respect to government subvention and as a legitimate means of salary supplementation for our staff who are anxious to resist temptations to work elsewhere. We believe also from experiences in other parts of the world, that the commitment of staff to these activities will refresh their own academic experience, enliven the curriculum, motivate students and lead to higher standards all round.

The match between development at national and university levels also provides a means to explore what might be lacking in the University. Agriculture is of predominant importance in Mala'wi, while Health and Education are major national needs and there is a small but growing industrial sector. The University provides training and research in all these areas. In contrast, one major geographical feature of the country is Lake Malawi, 300 miles long with an abundance of species of fish, with great potential for food, tourist and transport provision, and these are areas which the University does not yet cater for. Over 90 per cent of Malawians live in villages, the potential drift to large towns having been successfully resisted. The Centre for Social Research at the University and Department of Rural Development have been very active in

research into the realities of village life, but in view of the magnitude of this section of the country there is much more that the University could do to help to raise living standards in these remote areas.

THE PROBLEM OF STANDARDS

Any university is required to demonstrate the quality of its graduates. If the degrees are not acceptable by international standards, the university education is virtually useless; it would be better to invest the resources elsewhere in the educational system. The normal African university has to maintain such standards in a framework of very low funding. To achieve at all within severe financial restraints, it is necessary to place emphasis on the human resources we have and to concentrate on effective teaching by hard-working members of staff, with diligent and well-motivated students.

It is important to underline in this context the vital contribution which can be made by conformity to the norms of Malawian society. The independent nation was founded under the four corner-stones of Unity, Loyalty, Obedience and Discipline, and these are emphasized at all ages and in all aspects of life. There is in consequence a powerful work ethic, a respect for custom and tradition, and a drive for integrity. For the students at the University, this is shown in obedience to parents, respect for elders, attention to teachers, diligence in work and higher motivation in study. It is interesting that a recent tracer study of former graduates revealed that in terms of work motivation, service to the community rated much more highly than good salaries. Under this ethos, over the years the University has developed demands on students which might be considered draconian in other countries, but which appear to work successfully here. It is paradoxical that a major enemy to university progress can be the bad academic habits acquired by staff when working for doctorates abroad, but fortunately the Mala'wian virtues of discipline, work and care for students usually prevail.

We measure our success in terms of the overall student pass rate of 95 per cent with minimal number of drop outs (in the Polytechnic part of the University, the figure is nearer to 98 per cent), the objective comments of external examiners with international experience, and the achievements of postgraduate awards overseas in the minimum of time afer graduating here at first-degree level. We also provide good standards at very low cost. When I was in the United Kingdom recently visiting some universities, I noted the annual recurrent costs against the number of graduates produced, and discovered that we are producing quality graduates at about one-fifth the cost of the British ones. However low our resources — and, as indicated, we must work to improve the financial base — we cannot afford to fall below genuine international standards. We require dedication, commitment and concern to continue to achieve what would otherwise seem to be academically and financially impossible. What is lacking in finance is compensated for by the ethos of Malawian society, and it is a great asset of a developing country that moral, personal and spiritual issues are taken most seriously.

ACCESS TO EDUCATIONAL OPPORTUNITY

A further responsibility is to provide access: the University must use its influence to create educational opportunities at all levels. There are three major bottle-necks in Malawian education. For lack of finance, nearly half the children receive virtually no education at all. For those completing the eight standards of primary education, there is one place in ten at secondary schools. After four years of secondary education leading to the Malawi Certificate of Education, there is one place in six at the University. The position worsens each year as the school population increases by 5 per cent; the pass rate at secondary level, thanks to an injection of distance education successes, increases annually by 10 per cent but the University still offers only 600 residential places per year and this is clearly insufficient to support a national population of 8 million. The University necessarily has a responsibility to increase access opportunities. Each year now we have the tragedy of over 2000 qualified, able students unable to gain a place. We are beginning new modes of attendance. Nonresidental places are being offered, part-time day-release and block-release courses are available, courses in the long vacations are being offered, and longer-term plans for university-based distance education are being developed. With all these devices, expansion of student capacity is still highly expensive; here we must argue to reverse current World Bank thinking with its spurious economic rate of return arguments so detrimental to university growth.

The theory propounded (*Financing Education in Developing Countries*, World Bank, 1986) is that since the economic rate of return from the primary sector of education is superior to that of the secondary sector, which in turn is higher that that from tertiary education, a developing country should direct its scarce resources away from the university towards building up primary education. Yet the primary sector is, comparatively speaking, so large and in most cases so chronically underfunded that vast sums need to be spent to make a significant difference to quality. Only a fraction of donor spending on this sector could make a vital difference to the much smaller tertiary sector which, with its more immediate proximity to national development, could provide far better value. The real growth of the primary system must be a function of the economic development of the whole nation and not the sum of randomized donor increments. With respect to education, the major responsibility of the university is to do what it is able to in improving the quality of primary and secondary sectors as they currently exist. The university can provide research into the realities of education, specialized courses for teacher-training staff, in-service development for head teachers and inspectors, validation of primary teacher-training courses, primary and secondary curriculum development, assessment and evaluation. The future of the university lies in the strength of the primary and secondary sectors, and it is a major task to direct its expertise towards the improvement of the quality of education at all levels. This must include an appropriate input to adult education, to enhance the provision being made to help the largely illiterate adult population.

VOCATIONALISM

A consequence of the philosophy of increased access is that the University will necessarily be concerned at the vocational outlets available for the existing and enhanced numbers of students. The vision which seeks the full educational development of those able to benefit must follow through to seek the right personal fulfilment in the world of work. We therefore take a major interest in the job prospects of our graduates, primarily for the benefit of the individual but also to show some return for the not inconsiderable expenditure necessary in preparing a graduate. The University is, as stated earlier, has the good fortune to be largely vocational in nature, and consequently most of our students find employment without difficulty. However, constant vigilance is needed as vocational prospects fluctuate. We operate three measures to meet this problem.

First, we try to discover and obtain reliable information on what happens to our students after graduation and in their subsequent careers. To this end, we have tracer studies operating in four Colleges and another survey to determine the needs of industry in relation to our courses. The aim is to discover how appropriate our programmes have been and to determine if we have achieved the right match between the courses we offer and national manpower requirements. Obviously we are not seeking crude vocational training for our students, but we do want to know if we are providing the right educational foundations, and make corrections if we are not.

Second, we can identify a particular source of unemployment in students graduating from Humanities and, to a lesser extent, the Social Science Faculties. This is a serious problem, because we want students who wish to take the Humanities subjects not to be deterred by the poorer employment prospects. To achieve this, we are about to launch for these students a series of one-year conversion courses which will give a good professional introduction into the

Research and Higher Education in Newly Industrialized Countries

Philip G. Altbach

INTRODUCTION

Universities have always been key institutions for training highly-skilled personnel. Only recently have they also assumed the role of research centres for countries which are moving towards technologically-based economies. Developments in the newly industrializing nations in East and Southeast Asia are of special interest because these societies have achieved impressive economic success and are now investing heavily in higher education as part of a strategy for rapid scientific development. Examples of such scientific developments can be seen in the establishment of the Korean Institute for Advanced Science and Technology (KIAST), the links between several national universities and the Science-Based Industrial Park in Taiwan and the new technological university which will soon open in Hong Kong. All of these institutions are intended to propel their countries to the frontiers of scientific development, to link basic research in these sciences to industrial and technological development and to provide mature advanced training for researchers and professionals.

The development of a sophisticated research infrastructure is an expensive and complex process yet it is a necessary part of the establishment of an independent scientific base that can contribute to high-tech development. The newly industrialized countries (NICs) have, for the most part, relied on imported knowledge for development. Even Japan, until quite recently, was dependent on basic scientific research from abroad for its technological development. Japan is now moving rapidly to develop capability in basic research and also in the communication of research results abroad.

RESEARCH AUTONOMY

Full research autonomy in an interdependent scientific system is not possible. Science, by its very nature, is international. Scientific communication, through journals and, to some extent databases, is also international and to a considerable extent in English, the current international language. It must also be understood that the international scientific infrastructure is characterized by inequalities. The bulk of the world's scientific research is done in a few countries. It is estimated that more than 80 per cent of the world's research and development (R&D) spending takes place in a handful of major industrial countries, United States being the dominant (but declining) research power, and Japan increasing its share of research expenditures . The scientific communications network is just as concentrated, with the large proportion of journals published in English and edited from the United States or, to a lesser extent, from Great Britain. Thus, there are important world scientific centres and many peripheries.

The newly industrializing countries have been moving towards scientific development and as much autonomy as is possible in an interdependent world. This development is extremely important for a number of reasons. The creation of sophisticated scientific capability, including scientific institutions capable of doing basic research, is needed to establish a self-confident science infrastructure — one that can train needed personnel and which has the capability to respond to emerging international trends. Advanced scientific structures are necessary, not only for the production of research but also for the assimilation and communication of trends from the world's scientific centres.

A significant portion of the scientific communities of countries like Taiwan and South Korea work abroad. The establishment of an independent scientific base has lured some of these scientists back from the Unites States. Even when these researchers do not return, they can interact with scientists at home. For example, researchers from such countries as India and Taiwan working in the computer industry in California have contributed significantly to applied development in their native countries. It is necessary to have an active indigenous scientific community in order to attract home local scientists working abroad, and to maintain close links to the knowledge that is created abroad.

SCIENTIFIC DEVELOPMENT

Research-oriented universities are the key to scientific development and to both basic and applied R&D. These institutions, of course, also provide the high-level training required by high-tech industries. The NICs are moving rapidly towards ensuring that they have a sufficient number of world-class universities to serve as scientific centres, points of knowledge transfer and repositories of data and complex laboratory equipment.

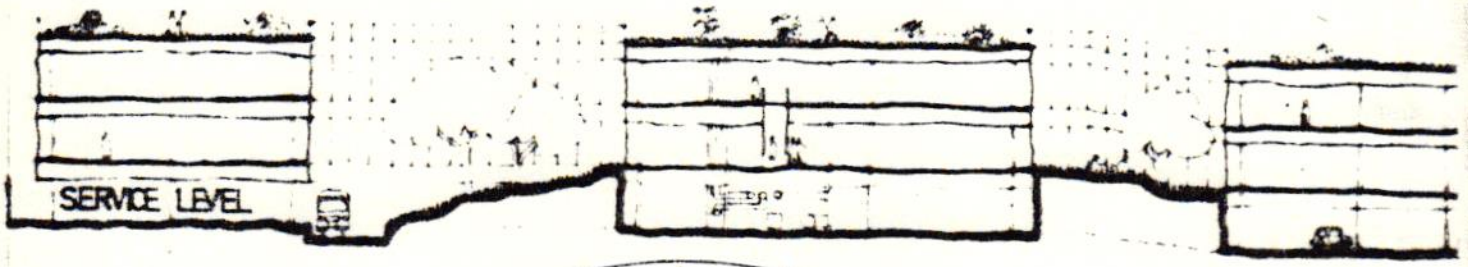
It is significant that with one or two exceptions, (mainly in Taiwan) the Asian NICs have not set up free-standing research institutes along Soviet lines. Such institutes, while fairly successful in producing quality research and more easily controllable by governments, are hampered by their lack of relationships with the universities, particularly with the stimulating interplay of teaching and research at doctoral level. India, with the largest scientific infrastructure in Asia, has suffered from a scattering of research in a variety of specialized institutes as well as in a few of the top universities.

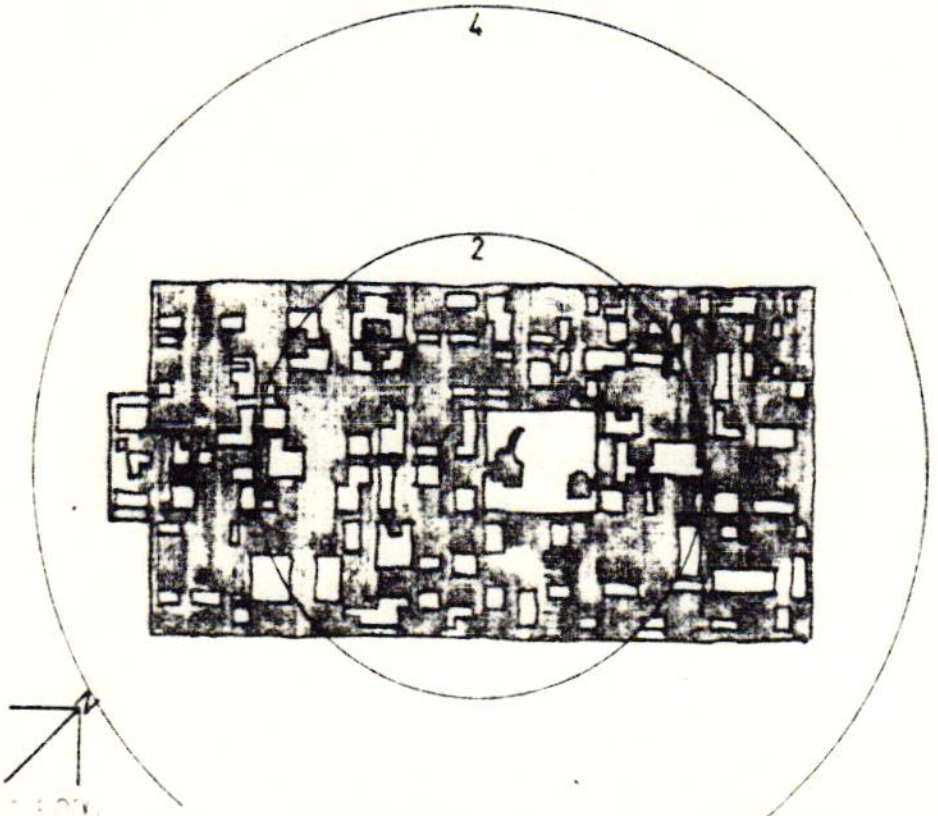
The implanting of a scientific culture is not an easy thing. It requires a significant degree of autonomy — the freedom not only to choose research topics and to control the curriculum, but also to ensure that the academic staff have a high level of academic freedom. It is always a challenge for governments, which after all provide most of the funding for higher education, to permit universities to control their own destinies and even more a challenge for them to allow professors the freedom to carry out research and write on subjects which may run counter to current state policy. A scientific culture also requires academic institutions to be run along meritocratic lines, with no political interference in appointments and promotions. It means that productivity must become an important criteria for promotion as well.

STATUS AND LANGUAGE

Universities in the NICs are both national and international institutions. They function in a national environment and serve national needs, but they are also part of an international culture. The issue of language in this respect is important. Universities in the NICs must have access to the English language world of international science, yet at the same time they need to communicate internally. The NICs indicate some different approaches to the complex language issue. In Singapore, the response has been clear — the entire higher education system operates in English (as does most of the primary and secondary education). All teaching and writing is in English. About half of the academic staff at the National University of Singapore are expatriates. In Taiwan, the academic institutions function in Chinese, but the major journals in the 'hard' sciences are in English and academics are also expected to

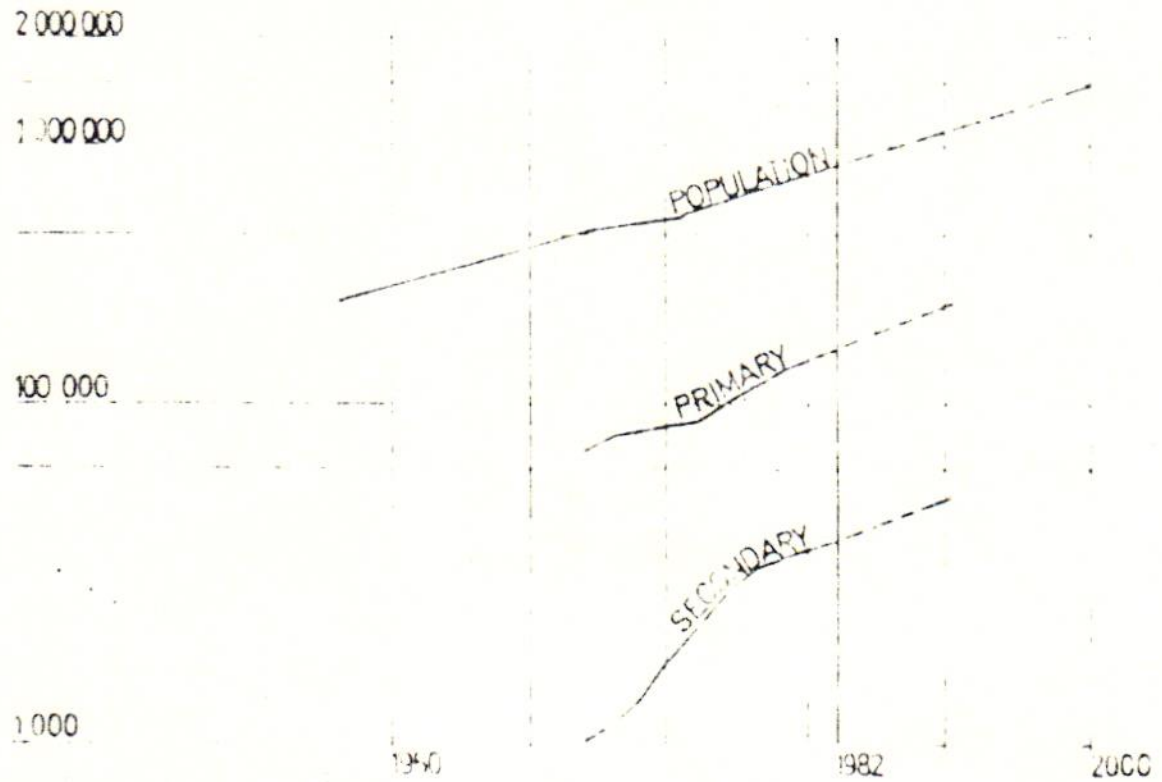
SECTION 1:500





2/1 BERLIN FREE UNIVERSITY

CANDILIS JOSIC WOODS COMPETITION ENTRY 1963
3600 STUDENTS


2 000 000
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POPULATION
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1982
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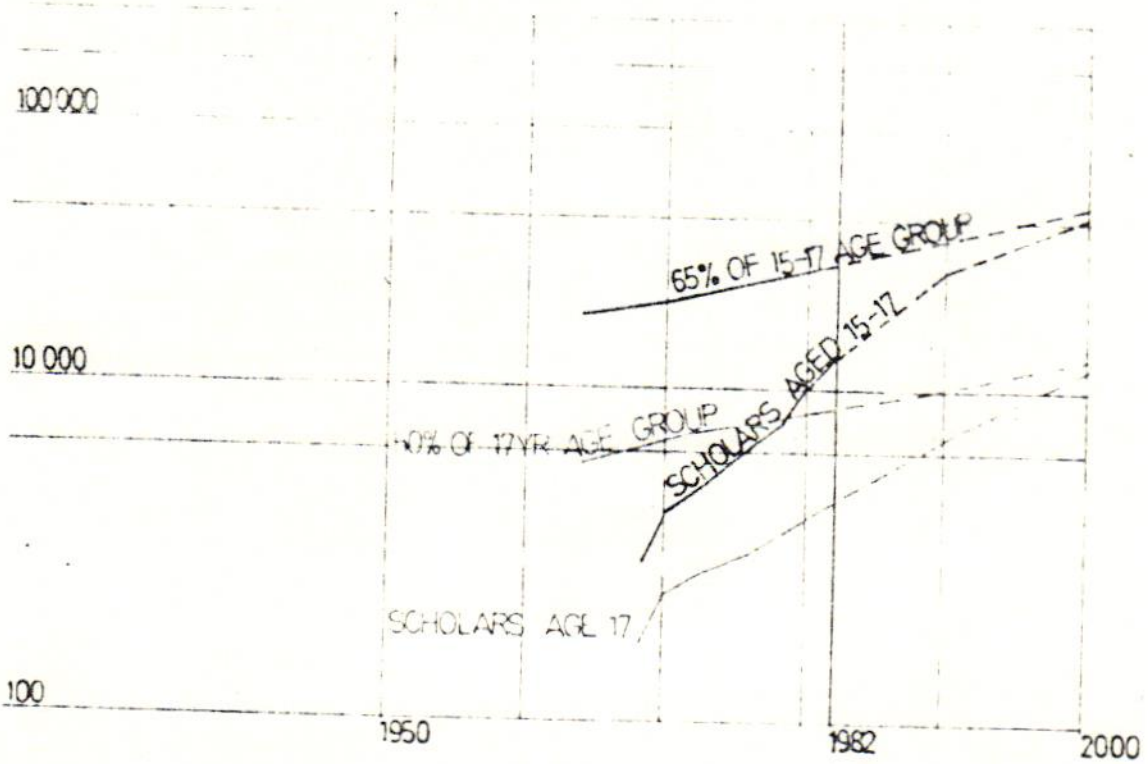
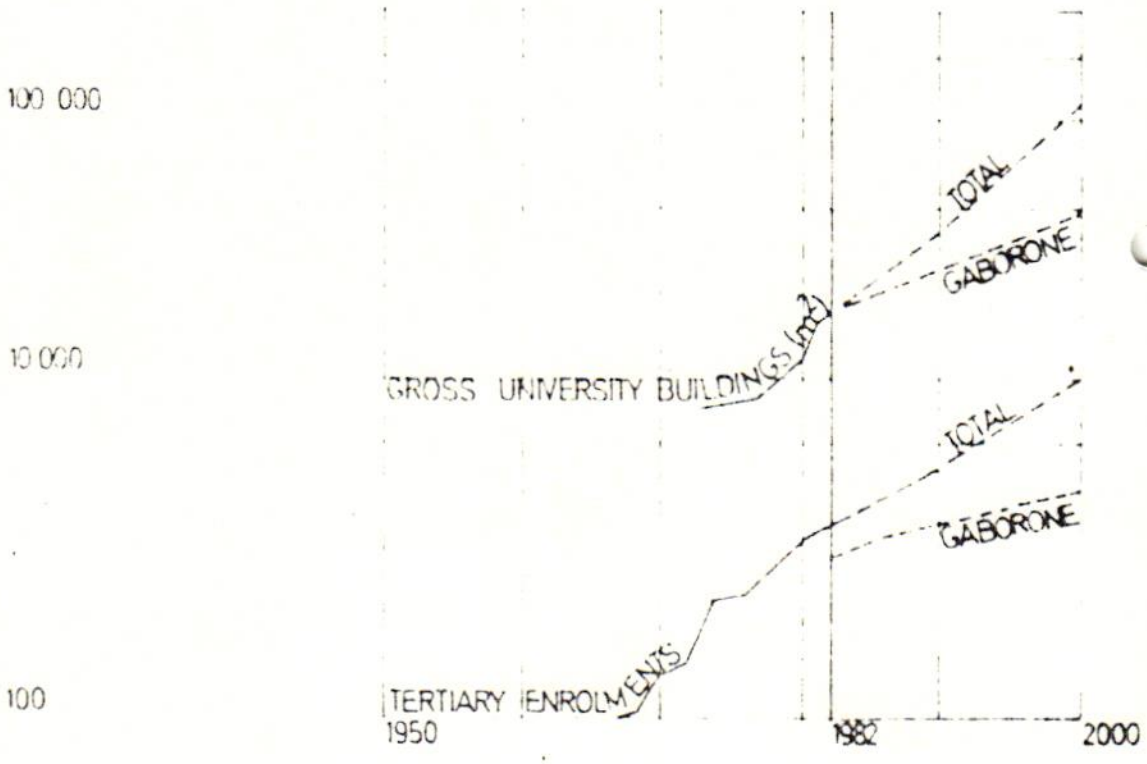
4.1


100 000
10 000
100
65% OF 15-17 AGE GROUP
10% OF 17YR AGE GROUP
SCHOLARS AGED 15-17
SCHOLARS AGE 17
1950
1982
2000

4.2


100 000
10 000
100
GROSS UNIVERSITY BUILDINGS (m²)
TOTAL
GABORONE
TERTIARY ENROLMENTS
TOTAL
GABORONE
1950
1982
2000

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...struction

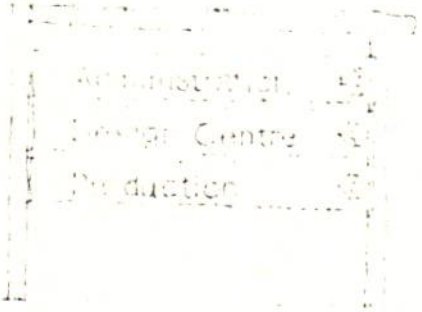
White on green

Emergency

White on red

Danger

2



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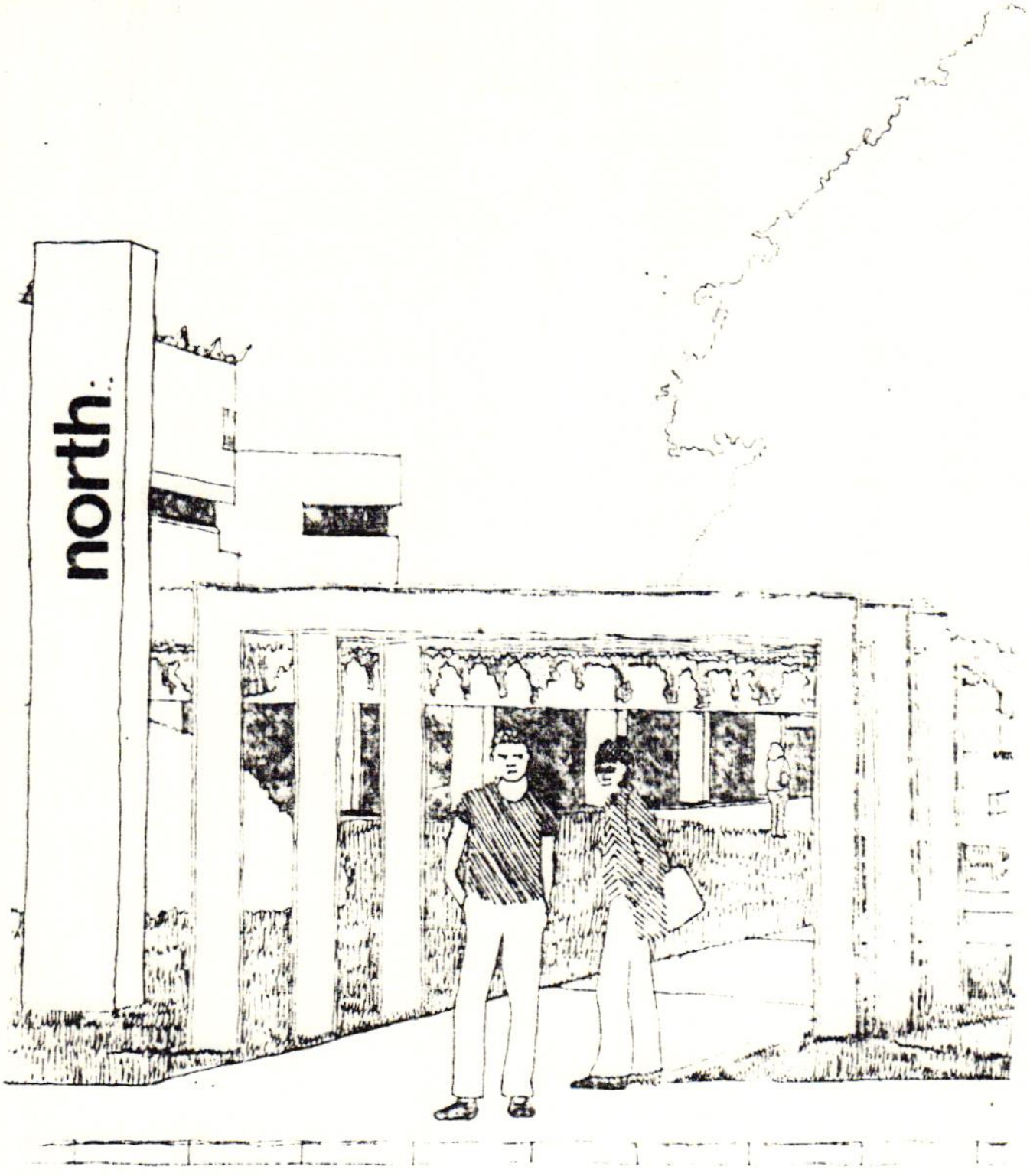

10.2.2

architectural competitions.

g) That if for any reason an architect wanted to build over our service walkways that the Development Committee would consider this on an individual case basis.

h) That the location of the proposed theatre be reconsidered re parking and circulation.

i) That we accept the architects report in principle on building heights but in the future two storey buildings may be required where the architect indicates these as single storey along the ring road.

j) That with respect to sports facilities these should not be duplicated with the facilities across Notwane Road.

k) That with respect to the Kitchen/dining facilities, this Committee recommended that a Sub-Committee be appointed to study the question of additional Kitchen/dining facilities on the campus. There is a number of questions to be answered concerning number of students on campus, how meals should be paid for, how many meals should be served etc.

l) That with respect to the Laundry, this Committee recommends that this question should be examined, and if possible, answers found to the question of providing laundry services for the students. This Committee recommends that the laundry facilities as presently constituted be abandoned or revised.

The students could either do their own laundry or perhaps a private Laundromat could be established on campus.

m) That with respect to the existing library building,(when the new library is finished) this Committee recommends that the use of the existing library be studied by the Committee presently meeting on National Development Plan VI.

n) That the Master Plan Architects should be closely involved in all campus development re approval of all the proposed site plans, building regulations, general design principles. This could only be done through the Development Committee as our Master Plan Architect has no powers to act other than as a consultant to the Development Committee who could then take any necessary action required.

[Add title page]

SADCIA file

UIA6
IN SEARCH OF THE APPROPRIATE.

A view from Southern Africa.

Introduction

Appropriate: 'suitable' or 'proper' from the Latin root 'own'.

The notion of appropriateness, although it has been with us as long as the word for it, has only begun to be applied to architecture relatively recently. This is not because we have only now realised that an appropriate thing is better than an inappropriate one, but because our appetite for and ability to produce inappropriate solutions has increased greatly while, at the same time, in parts of the world, inappropriate solutions have become a luxury which we can no longer afford. The search for the appropriate has not been made any easier by the fact that the complexity resulting from increasing economic technical and cultural interdependence is sometimes beyond the understanding of decision-makers, while the sheer pace of development required imposes on us a timetable in which there is often no room for the research necessary for identifying the appropriate solution.

The above is doubly true for the developing world. Not only has the notion of appropriateness come to us late, but it also often came not as a notion, but as a ready-made "appropriate solution". It is amazing how few people realise that "appropriate solutions" do not travel well.

Although great strides are being made in our region in many aspects of development, the design of higher education facilities seems to pose a particular problem as far as appropriateness is concerned. The reasons for this situation seem to be the following:

Our higher education is modelled on an academic world culture, tending to spread from the developed to the developing world. To a relatively unsophisticated public, social function is often associated with built form, and with the buildings of the developed world, being far better illustrated than those in the third world, the image of the desirable and correct facility tends to be the first world model, however inappropriate it may be for our region's climate or economic situation.

Higher education facilities are usually commissioned by the state governments, whose desire to build monuments to themselves is certainly not without precedent all over the world. While we accept the idea of the necessary monument, the scale and nature of national universities, like national airlines, is often a matter of pride rather than necessity. Many of the educational needs of our region could be more economically satisfied at a regional level. Political and tribal considerations also have a history of overriding real needs. Architects often find it quite difficult to enter into dialogue with economists regarding the resources and characteristics of our region, while at the same time being as tempted as any to design and build monuments.

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The context

The ten SADC countries define the southern Africa region for the purposes of

this discussion, but we also make reference to data for subsaharan Africa and Botswana. The states in the SADC region are fairly new, and have tended to have their governments control and direct their economies and educational systems. Past political instability has hampered progress. There presently appears to be a spirit of cooperation to a greater degree than previously, which may lead to more genuine economic links being permitted. The region has low gnp, and undeveloped human resources are the main reason, despite substantial natural resources.

Typically, schooling in the region comprises around 7 years for primary and five years for secondary level. Tertiary studies include Universities, Polytechnics and various high-level vocational training colleges. Higher education is seen as being of paramount importance for Africa's future. Subsaharan university enrollments have grown from 1200 in 1960 to 440 000 in 1983, but ~~present~~ current indications are that the present structure is unsuitable and the efficacy of the systems is questionable.

The region is characterised by unpredictable climatic conditions, undeveloped or undervalued natural resources and, above all, underdeveloped human resources.

Teachers are generally in short supply; staff development in Africa at tertiary level is lagging badly. Facilities, funds and staffing are generally inefficiently structured.

Given this, the pace of development required, multiplied by a 3% population growth rate and the need to satisfy the most basic of human needs is not being achieved, despite the fact that certain states have excessive numbers of graduates in certain fields.

For Botswana, the defined national objectives are democracy, development, self-reliance and unity. Planning of development has the objectives of sustained development, rapid growth, economic independence and social justice. While short term fluctuations in emphasis occur, the aim is to balance all of these in the longer term. This set of objectives is not untypical of states in the region.

In the educational sphere, recent deterioration is reducing the capacity of Africa's tertiary institutions to contribute to regional development. These establishments must have their quality restored and then considerably improved to allow the region to make its own best uses of the rapid advance of science and technology. Most states, however, will first need to rearrange their systems to fit present changed economic circumstances before moving on to improvements. Institutions, campuses, departments and programmes need to be combined into larger, more viable units. Staffing, in particular academic but also non-academic, needs to be reduced while upgrading levels of relevant training and experience. Student numbers need to be stabilised by increasing entry and performance requirements while introducing the notion of real costs for board and lodging, this being mitigated for genuine cases of need. From this, a sound base would be established to expand necessary graduate numbers and the scope of the research and community activities presently struggling to survive. The utilization of existing facilities and the planning of new ones is an integral part of such restructuring.

Although the advantages of appropriate solutions seem self-evident, we would

like to highlight the penalties imposed on our region by this often unconscious preference for the inappropriate ones. These costs, while mostly hidden, are becoming unsupportable to our resource-starved economies and social systems.

Proportionally high expenditure on higher education deprives other, often more necessary levels of education of the necessary funding.

Within higher education, the proportionally high expenditure on buildings depletes higher educations budget with the result that there are insufficient funds for the proper running of the facility.

Inappropriate design with regard to climatic controls often commits the institutions to ever mounting costs of purchasing, running, maintaining and replacing of mechanical climate controls, while a lot of unnecessary use of sophisticated materials, construction methods and finishes makes it necessary to employ specialised or highly skilled construction and maintenance labour, which often needs to be imported and which, even if locally available, does not come cheap.

The widening gap between the rich and the poor, while acceptable to most on the rich side, is not part of our Governments stated aims and objectives, and yet it can be seen as a result of the continuous over-provision for the needs of the upper strata of our societies.

The graduates of higher education institutions often either leave for richer countries in search of the high standard, to which they have become accustomed, or stay on only to take up what they think is their rightful place among the country's new aristocracy. Some also show signs of becoming permanent students highly qualified but not contributing to the society.

The tertiary facility

Adverse economic conditions bring the need for appropriate solutions into sharp relief and have produced very satisfactory results in secondary and vocational facilities where funding was restricted. The search for such solutions should be equally rigorous at each level of planning.

Academic plan

Various historical and social phenomena have created a number of models, thorough understanding of which is necessary in deciding whether any one of those is applicable, or whether the project is without precedent. This, in turn, calls for an in-depth understanding of the context i.e. the role that is, should be and could be played by the institutions of higher learning in our society. As this is to a certain extent a political decision, politicians should be expected to participate in its making. Their influence should be moderated by those professionally involved in academic, social and related developmental issues.

Higher education has a particularily important role to play in the society, and is seen as the "engine which pulls the train". While not in any way disagreeing with the basic logic of this approach, we feel that better use of resources in the sphere of higher education could have an important impact on

education as a whole. If, through increased funds, better education was provided at primary and secondary levels, as well as better vocational training, not only would there be an improvement in the quality of higher education, but also the "train" could begin to be partly self-propelled.

The social benefits of improved primary and secondary education are particularily important in a region undergoing such swift and profound economic and social change. The population's ability to become more than passive spectators has to be improved and understanding of the forces governing peoples lives has to be fostered if culture and self-esteem are to be preserved and developed.

The priority assigned to various fields of the economic and social development process should be reflected in the academic planning in order to correct present imbalances. Also to be taken into account is the fact that our region does not exist in isolation and that the process of building up of our higher education system is, of necessity, a very gradual one. External help is and will continue to be needed for many years to come. Specialists in subjects with a relatively limited social or cultural content can continue to be imported from other regions for a long time to come without any drastically negative effects, while others, whose field of expertise is closely related to local conditions, such as architecture, should be trained locally.

Programmes for regional co-operation in the field of higher education should be developed or strengthened, thus removing the unnecessary burden of providing a full range of higher educational opportunities on every individual country. Consideration must also be given to rationalising existing facilities, departments and teaching programmes to improve their viability.

Courses should be provided that can make use of existing employers, whose potential for training and education should be maximised.

Part-time and distance courses should be given a higher priority,thus giving more students the opportunity of financing their own higher education, while utilization of physical facilities should ensure year-round use.

Courses of long duration should be, whenever possible, split up into smaller components so that studying could be interrupted with periods of work, which would not only make it financially easier for the students in a more market-oriented milieu, but also allow for some practical application of newly acquired expertise.

The scope of the grown facility must be clearly and realistically considered in order to properly plan for growth.

The project team

The architects of our region, while as well trained as any, are often considered by the client not to be quite equal to the task of planning and designing something as big and complicated as a university. The result is that foreign firms are often invited to do the job. Those foreign firms are, and reasonably so, chosen for their experience in designing facilities of a similiar nature. Unfortunately, they often apply a number of "stock solutions", perceiving the problem to be mostly of functional or aesthetic nature. However, while this may be the case in the developed world, this is decidedly not so in our region.

The choice of architect, whether local or imported, often leaves much to be desired. Local architects sometimes get government commissions as a result of

a rota system which, while seemingly fair, is often simply a way of avoiding making potentially contentious decisions by the client. The decision is obviously easier in the case of expansion of an existing facility, or where the system has been in existance for long enough to give the local architects a chance to become specialised. When imported architects are commissioned, it is often for reasons of their "star quality", where the chances are that the architects main concern may be to perpetuate this image,rather than to find appropriate solutions to a local problem.

As mentioned above, because of the scale of the undertaking as well as the perceived national importance of the institutions of higher learning, in most cases it is the government that is the client. In addition to the specific disadvantages of having a government ministry or department for a client, where many problems arise out of perceived higher status of a government employee over any other person, all the usual disadvantages of having the client who is not the user are present.

The most negative result of this often less than satisfactory relationship between the architect and the client is usually lack of a coherent brief. Although it is perfectly understandable that there may not be sufficient expertise or experience within the client body to prepare such a document, this lack is very often not recognised or acknoweleged, nor is the necessary expertise allowed to be imported, usually for financial reasons.

As it can be said that a good building is a product of not only a good architect, but a good client and a good relationship between the two, it is most important that this be achieved. Following are some recommendations which we feel would improve the situation in this respect and, hopefully result in appropriate solutions:

The client body should, whenever possible, be composed of not only of the financial backers but also of educational specialists, members of the academic staff, administration, housekeeping, maintenance and students, all of whom should be guided and advised by an independent, accomplished and locally experienced architect/planner. The region has a number of established higher education facilities, whose own planning units employ number of persons fitting this description. In the case of a brand new institution, the academic appointments have usually not yet been made, which makes arriving at a detailed brief without clear competent guidance from experienced academics impossible.

It is often of benefit to have the firm/s of architects selected through a competition for an overall masterplan, with the brief for that competition having been prepared by the client body, as described above. The jury should be composed of selected number of representatives of the client body, with an additional, regionally recognised architect.

The more detailed brief for the individual buildings and external spaces should be developed with the participation of the architect chosen for the master plan, and of future members of the faculty and staff. If such appointments have not yet been made, or if their experience is limited, external specialist consultants should be brought in, though their influence should be moderated by persons with local expertise.

If the scope of the project is too large for the winning architectural firm to handle. the selected firm should be allowed to enter into an association with other practices, preferably with the runners-up in the competition, in order to maintain control over the entire project. This kind

of authority can be given to a practice only if the aims and objectives of the winning master plan are very clearly defined and satisfy an equally carefully designed brief.

Analysis of requirements

Once the brief is clear, the standards and regulations which are appropriate and/or required must be considered and defined. Appropriate standards are a contentious area, and may be particularly difficult to define in ways that reconcile environment, access, hazard, space and fittings with each other and the financial constraints. The issue must, however, be confronted as the concept of appropriateness hinges on these decisions.

The staff employed by our higher education facilities are often recruited in the developed world and bring with them demands for excessively high standards as pre-conditions for their employment. This factor must be taken into consideration.

A particular requirement, because of the substantial residential component typical in the region, is the need for the institutions to function as communities. This function should be recognised and the positive aspects of this feeling of community should and can be reinforced with appropriate planning. What we feel should not be emphasised is the difference between this and all the other existing communities. Exclusivity breeds without any help from the planners. Isolated sites impose notable extra costs in creating an entire social and municipal infrastructure.

Site criteria

Choice of site: Although this decision is usually made at an early stage and for reasons often unrelated to its suitability for the purpose, we feel that it would be an improvement if the brief allowed a choice between several available sites, a situation still possible in our region where large pockets of land are still held either by central or local government. This choice should be well justified, with the quality of the justification being a fairly good indication of the architects' grasp of the overall impact and significance of the proposed development. The brief should be specific about the initial size of the project, its envisaged rate of development and its optimum size. The growth aspect is of particular importance in our situation and should be dealt with decisively in this initial stage.

Use of site. Although the cost of land is still comparatively low, it is a finite resource and as such should not be allowed to be wasted. An optimum density should be arrived at, which on one hand limits the necessity for use of mechanical lifts, while on the other leaves a sufficient amount of open space for light, ventilation and other uses. Our climatic conditions permit extensive use of outdoor spaces, which can be enhanced with a minimum of intervention. The patterns of social interaction also increase the value of open space as a venue for socialising, and such usage should be promoted wherever possibilities exist.

Preparation of brief

As described in the previous section, the brief becomes the single most important input into a succesful design. It should be prepared in several stages with various carefully defined degrees of detail. The amount of research necessary for its sucessful formulation should be foreseen and budgetted for. Any attempted savings at this stage are likely to result in

increased expenditure later.

Although our region does not abound in buildings which have outlived their uses, the idea of using existing buildings, even if already occupied by another institution, should be considered. The advantages seem to outweigh the discomforts with the main benefits being that the actual teaching can begin much earlier than if it had to wait for the completion of the building programme, and that the staffing is completed in time for the staff members to be given their say in the formulation of the detailed requirements for their respective departments.

Services

We are not generally in a position to run sophisticated energy generation schemes for a campus. Universities use the public utilities for electricity, water, drainage and solid waste removal, with the exception of medical training facilities with incinerators. Appropriate here relates more to suitable thermal design and minimising of artificial illumination, as well as to ensuring that there is space and access for easy maintenance of the municipal services. There is a need to design for fault tolerance in situations where services/maintenance are in question.

Design

The architect engaged in developing a brief targetting appropriateness is likely to carry this attitude through to the design stage. The final product should avoid paying mere lip-service to the idea. Application of the idea should also tend to produce some design consistency in the developing campus in reflecting local resources and climate. An example is the initial architecture and planning for the University of Botswana, while a lack of concern shows in recent work on the campus.

Construction and maintenance

Preference should be given to common or popular construction methods, materials and components.

Critical in maintaining academic standards is the ability to obtain spare parts for maintenance and repair of equipment, routine replacement, upkeep and upgrading of plant, utilities, vehicles and equipment, and supplies of necessary consumables. We note the sad report from Ibadan in Nigeria that 'For several months now we have been expected to run a physics laboratory without electricity, perform biology and zoology experiments without water and get accurate readings from microscopes blinded by use and age' as a not uncommon phenomenon.

Conclusion

Africa needs to use its resources far more effectively, and we believe that appropriate development of tertiary education facilities can make a notable contribution.

Ewa Gurney and David Young

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Appendices

Table 1 (6-1)

Table 2 (6-4)

+ NDP graphics

73, 74, 77, 78, 80, 92.

UIA2

IN SEARCH OF THE APPROPRIATE.

A view from Southern Africa.

Introduction

Appropriate: 'suitable' or 'proper' from the Latin root 'own'.

The notion of appropriateness, although it has been with us as long as the word for it, has only begun to be applied to architecture relatively recently. This is not because we have only now realised that an appropriate thing is better than anything inappropriate, but because our appetite for and ability to produce inappropriate solutions has increased greatly while, at the same time, in parts of the world, inappropriate solutions have become a luxury, which we can no longer afford. The search for the appropriate has not been made any easier by the fact that the complexity resulting from increasing economic technical and cultural interdependence is sometimes beyond the understanding of decision-makers, while the sheer pace of development required imposes on us a timetable in which there is often no room for the research necessary for identifying the appropriate solution.

The above is doubly true for the developing world. Not only has the notion of appropriateness come to us late, but it also often came not as a notion, but as a ready-made "appropriate solution". It is amazing how few people realise that "appropriate solutions" do not travel well.

Although great strides are being made in our region in many aspects of development, the design of higher education facilities seems to pose a particular problem as far as appropriateness is concerned. The reasons for this situation seem to be the following:

1. Our higher education is modelled on an academic world culture, tending to spread from the developed to the developing world. To a relatively unsophisticated public, social function is often associated with built form, and with the buildings of the developed world, being far better illustrated than those in the third world, the image of the desirable and correct facility tends to be the first world model, however inappropriate it may be for our region's climate or economic situation.

2. Governments tend to favour styles and monuments regardless of their efficacy and economy.

3. It is a common fault of clients that they do not understand that architects are trained to solve any design commission; it is a not uncommon fault of architects that they fall into a local rut and cannot rise to the challenge of an uncommon commission. A resulting tendency is for a regional client to call in external experts, possibly selected because of their media stardom. Such experts not unusually arrive with packages or prejudices which exclude the appropriate from the list of priorities.

4. Regional architects, belonging to a social elite, often find it quite difficult to enter into dialogue with economists regarding the resources and characteristics of our region, while at the same time being as tempted as any to design and build monuments.

5.

The context

The region

Higher education facilities are usually commissioned by the Governments, whose desire to build monuments to themselves is certainly not without precedent all over the world. National universities, like national airlines, are often a matter of national pride more than national necessity. Some of the educational needs of our region could be much more economically satisfied at a regional level than at a national one. Other political and often tribal considerations override real needs.

The societies

Objectives

Choice of social model. Various historical and social phenomena have created a number of precedents, thorough understanding of which is necessary in deciding whether any one of those is applicable, or whether the problem to be solved is without precedent. This, in turn, calls for an in depth understanding of the problem i.e. the role that is, should be and could be played by the institutions of higher learning in our society. As this is to a certain extent a political decision, politicians should be exepcted to participate in its making. Again, their influence should be moderated by those professionally involved in social issues, as well as those knowledgable in the mechanics of urban development.

Resources

While the pace of development considered necessary in the developed countries is dictated by population growth, unemployment rate and the rate of inflation, all of which are relatively low, combined with the popular desire to improve individual economic circumstances which, comparatively speaking, is more on the level of wants rather than needs, this pace can usually be sustained given the resources available, and any temporary setbacks rarely produce truely catastrophic results.

This is decidedly not the case in the countries of the developing world. There, the pace required is multiplied by a much higher population growth and the need to satisfy what are the most basic of human needs.The additional drag on the pace of development required is exerted by the often unpredictable climatic conditions, undeveloped or undervalued natural resources and, above all, underdeveloped human resources.

c. inflation rate

Priorities

Although the advantages of appropriate solutions seem self-evident, we would like to highlight the penalties imposed on our region by this often unconscious preference for the inappropriate ones. These costs, while mostly hidden, are becoming unacceptable to our resource starved economies and social systems.

1. Proportionally high expenditure on higher education deprives other, often more necessary levels of education of the necessary funding.
2. Within higher education, the proportionally high expenditure on buildings depletes higher education budget with the result that there is often insufficient funds for the actual proper running of the facility.

3. Inappropriate design with regard to climatic controls often commits the institutions to ever mounting costs of purchasing, running, maintaining and replacing of mechanical climate controlls, while a lot of unnecessary use of sophisticated materials, construction methods and finishes makes it necessary to employ specialised or highly skilled construction and maintenance labour, which often needs to be imported and which, even if locally available, does not come cheap.
4. The widening gap between the rich and the poor, while acceptable to most on the rich side, is not part of our Governments stated aims and objectives, and yet it can be seen as a result of the continuous over-provision for the needs of the upper strata of our societies.
5. The graduates of higher education institutions often either leave for richer countries in search of the high standard, to which they have become accustommed, or stay on only to take up what they think is their rightful place among the country's new aristocracy.

Education

In this context it is easy to see why the development of education takes precedence over most other components of our region's development plans,as well as why the resources which can be allocated for it fall far short of what is needed.

Higher education has a particularily important role to play and is seen as the "engine which pulls the train". While not in any way disagreeing with the basic logic of this approach, we feel that better use of resources which could be achieved in the sphere of higher education could have an important impact on education as a whole. If, through increasd funds, better education was provided at primary and secondary levels, as well as vocational training, not only would there be an improvement in the quality of higher education, but also the "train" could begin to be partly self-propelled.

The social benefits of improved primary and secondary education are particularily important in a region undergoing such swift and profound economic and social change. The population's ability to become more than passive spectators has to be improved and understanding of the forces governing peoples lives has to be fostered if culture and self-esteem are to be preserved and developed.

The priority assigned to various fields of the economic and social development process should be reflected in the academic planning. What should, however, also be taken into account is the fact that as our region does not exist in isolation and that the process of building up of our higher education system is, of necessity, a very gradual one. External help is and will continue to be needed for many years to come. Specialists in subjects with a relatively limited social or cultural content can continue to be imported form other regions for a long time to come without any drastically negative effects, while others, whose field of expertise is closely related to local conditions, such as architecture, should be trained locally.

Coincidentally, this also seems to make good economic sense, as many facilities devoted to training of students in advanced sciences and technology are also the most expensive ones in terms of specialised buildings and equipment.

Programmes for regional co-operation in the field of higher education shoul be developed or strengthened, thus removing the unnecessary burden of providing a full range of higher educational opportunities on every individual

country.

Courses should be provided that can make use of the existing institutions, whose potential for training and education should be maximised.

Part-time courses should be given a higher priority,thus giving more students the opportunity of financing their own higher education.

Courses of long duration should be, whenever possible, split up into smaller components so that studying could be interrupted with periods of work, which would not only make it financially easier for the students, but also allow for some practical application of newly aquired expertise.

The tertiary facility

Academic plan

The staff employed by our higher education facilities are often recruited in the developed world and bring with them demands for excessively high standards as pre-conditions for their employment.

The project team

The architects of our region, while possibly as well trained as any, are often considered by the client not to be quite equal to the task of planning and designing something as big and complicated as a university, with a result that foreign firms are often invited to do the job. Those foreign firms are, and reasonably so, chosen for their experience in designing facilities of a similiar nature. Unfortunately, they often apply a number of "stock solutions", perceiving the problem to be mostly of functional or aesthetic nature. However, while this may be the case in the Developed world, this is decidedly not so in our country.

As mentioned before, because of the scale of the undertaking as well as the perceived national importance of the institutions of higher learning, in most cases it is the governmant that is the client.

In addition to the specific disadvantages of having a government ministry or department for a client, where many problems arise out of perceived higher status of any government employee over any other person,all the usuall disadvantages of having the client who is not the user are present.

The most negative result of this often less than satisfactory relationship between the architect and the client is usually lack of a coherent brief. Although it is perfectly understandable that there may not be sufficient expertise or experience within the client body to prepare such a document, this lack is very often not recognised or acknoweleged, nor is the necessary expertise allowed to be imported, usually for financial reasons.

In the case of brand new institution, which is being planned, the academic appointments have usually not yet beein made, which makes arriving at a detailed brief impossible.

The choice of architect, whether local or imported, often leaves much to be desired. Local architects sometimes get government commissions as a result of a rota system which, while seemingly fair, is often simply a way of avoiding making potentially contentious decisions by the client. The decision is obviously easier in the case of expansion of an existing facility, or where

the system has been in existance for long enough to give the local architects a chance to become specialised. When imported architects are commissioned, it is often for reasons of their "star quality", where the chances are that the architects main concern may be to perpetuate this image,rather than to find appropriate solutions to a local problem.

As it can be said that a good building is a product of not only a good architect, but a good client and a good relationship between the two, it is most important that this be achieved. Following are some recommendations which we feel would improve the situation in this respect and, hopefully result in good i.e. appropriate solutions:

1. The client body should, whenever possible, be composed of not only of the financial backers but also of educational specialists, members of the academic staff, administration, housekeeping, maintenance and students, all of whom should be quided and advised by an independent, possibly accomplished and locally experienced architect/planner. The region has a number of established higher education facilities, whose own planning units employ number of persons fitting this description.

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3. The more detailed brief for the individual buildings and external spaces should be developed with the participation of the architect chosen for the master plan, and of future members of the faculty and staff. If such appointments have not yet been made, or if their experience is limited, external specialist consultants should be brought in, though their influence should be moderated by persons with local expertise.

4. If the scope of the project is too large for any one architectural firm to handle. it should be allowed to enter into an association with other practices, preferably with the runners-up in the competition, in order to maintain control over the entire project. This kind of authority can be given to a practice only if the aims and objectives of the winning master plan are very clearly defined and satisfy an equally carefully designed brief.

Analysis of requirements

Functional analysis. .....Our insitutions of higher learning, by virtue of having a substantial residential component tend to function as communities. This function should be recognised and the positive aspects of this feeling of community should and can be reinforced with appropriate planning. What we feel should not be emphesised is the difference between this and all the other existing communities. Exclusivity breeds without any help from the planners.

Site criteria

1. Choice of site. Although this decision is usually made at an earlier stage and for reason often unrelated to the proposed site's suitability for the purpose, we feel that it would be an improvement if the brief required the competition entrants to make a choice between several sites, which could be available, a situation still possible in our region where large pockets of land are still beinh held either by the central or local government. This

choice should be well justified, with the quality of the justification being a firly good indication of the architects' grasp of the overall impact and significance of the proposed development. The brief should be specific about the initial size of the project, its envisaged rate of development and its final or optimum size. The growth aspect is of particular importance in our situation and should be dealt with decisively in this initial stage.

Use of site. Although the cost of land is still comparatively low, it is a finite resource and as such should not be allowed to be wasted. An optimum density should be arrived at, which on one hand limits the necessity for use of mechanical lifts, while on the other leaves a sufficient amount of open space for light, ventilation and other uses.

Our climatic conditions permit extensive use of outdoor spaces, which can be enhanced with only minimum of intervention. This makes considerations such as comfortable walking distances quite specific to our situation. The existing patterns of social interaction also increase the value of open space as a venue for socialising. Full use should be made of any possibilities thus afforded.

Preparation of brief

As described in the previous section, the brief becomes the single most important input into a succesfull design. It should be prepared in several stages with various, carfully defined degrees of detail. The amount of research necessary for its sucessfull formulation should be forseen and budgeted for. Any attempted savings at this stage are likely to result in increased expenditure later.

Potential use of existing buildings. Although our region does not abound in buildings which have outlived their uses, the idea of using existing buildings, even if already occupied by another institution is being used. The advantages seem to outweigh the discomforts with the main benefits being: a. the actual teaching can begin much earlier than if it had to wait for the completion of the building programme, and

b. the staffing is completed in time for the staff members to be given their say in the formulation of the detailed requirements for their respective departments.

Material consumption

Design

Design considerations which should be derived from the brief are:

a. spatial
b. financial, including running costs and cost of maintenance
c. functional
d. site-related
e. energy use-related
f. growth-related

What the brief cannot try to dictate is:

a. aesthetics

a. cost
b. energy efficiency
c. ease of maintenance
d. aesthetics

Construction

Maintenance

Conclusion

SADCHA file

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UIA2

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The above is doubly true for the developing world. Not only has the notion of appropriateness come to us late, but it also often came not as a notion, but as a ready-made "appropriate solution". It is amazing how few people realise that "appropriate solutions" do not travel well.

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Governments tend to favour styles and monuments regardless of efficacy and economy.

It is a common fault of clients that they do not understand that architects are trained to solve any design commission; it is a not uncommon fault of architects that they fall into a routine rut and cannot rise to the challenge of an uncommon commission. A resulting tendency is for a regional client to call in external experts, possibly selected because of their media stardom. Such experts not unusually arrive with packages or prejudices which exclude the appropriate from the true list of priorities.

do not

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The context

The region

The ten SADC countries define the southern Africa region for the purposes of this discussion. In extent it is *km east-west and *km north-south, lying between the * and * parallels. The combined population is of the order of *. The geography varies from tropical forest to savannah to bushveld to semidesert to full desert, generally in the form of extensive plains, some of which are cut by considerable rivers.

Politically, there presently appears to be a spirit of cooperation to a greater degree than previously, which may lead to more genuine economic links being permitted. The main benefit of the SADCC phase has been to considerably ease communications and institute technical cooperation between the states.

This region has a varied sociopolitical situation ranging from vicious civil wars to peace and prosperity, though many of the worst political issues are presently in process of being resolved. Regression in development is beginning to show signs of slowing overall, with the prospect of a new emphasis on free economies leading to improvement in per capita income not just based on exporting natural resources. It is to be hoped that the present move away from kleptocracy takes hold, and that politicians cannot avoid accountability for their actions. One area of concern remains health, with Zambia in particular suffering severly from the present AIDS epidemic; doomsayers have predicted resulting depopulation on a large scale.

The present average gnp/capita in the region is USD*, but national averages range from * to *, and with a state like Botswana, the range is from * to *. Overall, * are illiterate, and rates of schooling completed are of the order of * primary, * secondary academic & technical and * tertiary academic, vocational and technical. If one sets developed-world rates against these, our eleven universities for * students could change to a university system for * students.

Higher education facilities are usually commissioned by the state governments, whose desire to build monuments to themselves is certainly not without precedent all over the world. While we accept the idea of the necessary monument, the scale and nature of national universities, like national airlines, is often a matter of pride rather than necessity. Many of the educational needs of our region could be more economically satisfied at a regional level. Political and tribal considerations also have a history of overriding real needs.

The societies

We are simplifying greatly in order to be brief. The full background will not be attempted here, but the majority of precolonial inhabitants stem from groups which appear to have expanded south from roundabout present Cameroun, settling and developing related but distinct languages and cultures as far as parts of South Africa, overlaying or bypassing the Khoisan who were the first known modern inhabitants. These tribes and their kingdoms existed, rose, fell, split and developed their societies over thousands of years.

Following the expansion of European interests and conflicts, the area was colonised, crystallizing the state boundaries as they now exist. Most of the states incorporate multiple tribes with their own languages and dialects. The common language for all but Angola and Mozambique becoming English, those two countries using Portuguese as their common language. Most of the region

emerged from the colonial period with democratic structures, many of which later became ideology-ridden, kleptocratic or both. Angola and Mozambique were the exceptions, both setting off into civil war soon after independence. War and incompetence have hit the regional economy hard, but the past two years have seen economic rationalization and a redirection towards democracy in the region.

Objectives

Botswana is used an a reference, but note that its access to funding is exceptional in the region.

For Botswana, the defined national objectives are democracy, development, self-reliance and unity. Planning of development has the objectives of sustained development, rapid growth, economic independence and social justice. While short term fluctuations in emphasis occur, the aim is to balance all of these in the longer term.

Various historical and social phenomena have created a number of models, thorough understanding of which is necessary in deciding whether any one of those is applicable, or whether the problem to be solved is without precedent. This, in turn, calls for an in depth understanding of the problem i.e. the role that is, should be and could be played by the institutions of higher learning in our society. As this is to a certain extent a political decision, politicians should be expected to participate in its making. Again, their influence should be moderated by those professionally involved in social issues, as well as those knowledgable in the mechanics of urban development.

Resources

While the pace of development considered necessary in the developed countries is dictated by population growth, unemployment rate and the rate of inflation, all of which are relatively low, combined with the popular desire to improve individual economic circumstances, more on the level of wants than needs, this pace can usually be sustained given the resources available, and temporary setbacks rarely produce catastrophic results.

This is decidedly not the case in the countries of the developing world. There, the pace required is multiplied by a high population growth rate (*%) and the need to satisfy the most basic of human Additional drag on the pace of development is exerted by the often unpredictable climatic conditions, undeveloped or undervalued natural resources and, above all, underdeveloped human resources.

c. inflation rate

Existing economic pattern here

Forecast at NDP 7:

The population of Botswana is expected to double in the next 25 years, the majority living in urban areas, although the rate of growth should diminish, thereby increasing the proportion of the population available for economic activity. Households are expected to become less reliant on government, and private sector activity is anticipated to make a greater contribution to growth and diversification in production and the financial areas of the economy. It is anticipated that expansion of education and training will lead to a situation where there is a surplus of most skills.

Aims for consideration

Improve income distribution and self-reliance of the public, freeing state resources and allowing real cost recovery. Reducing population growth and increasing productivity to boost gnp/capita. Conside rnew policies to foster balanced utilisation of natural resources. Export promotion for products rather than basic mineral exports. Make rural areas accessible to allow opportunities beyond farming. Financial sector to be developed to provide funding in urban and rural areas.

Priorities

NDP7 notes here
For Botswana, enjoying a burst of income from diamonds during the previous planning period, NDP7 notes that a gap emerged between the size of the development programme and government's ability to support it adequately. Recurrent expenditure and numbers of manpower in place had not risen sufficiently to meet the needs created in the new developments.

Although the advantages of appropriate solutions seem self-evident, we would like to highlight the penalties imposed on our region by this often unconscious preference for the inappropriate ones. These costs, while mostly hidden, are becoming unsupportable to our resource-starved economies and social systems.

Proportionally high expenditure on higher education deprives other, often more necessary levels of education of the necessary funding.
* data from NDP

Within higher education, the proportionally high expenditure on buildings depletes higher educations budget with the result that there are insufficient funds for the proper running of the facility.
* data

Inappropriate design with regard to climatic controls often commits the institutions to ever mounting costs of purchasing, running, maintaining and replacing of mechanical climate controlls, while a lot of unnecessary use of sophisticated materials, construction methods and finishes makes it necessary to employ specialised or highly skilled construction and maintenance labour, which often needs to be imported and which, even if locally available, does not come cheap.

The widening gap between the rich and the poor, while acceptable to most on the rich side, is not part of our Governments stated aims and objectives, and yet it can be seen as a result of the continuous over-provision for the needs of the upper strata of our societies.
* data from NDP

The graduates of higher education institutions often either leave for richer countries in search of the high standard, to which they have become accustomed, or stay on only to take up what they think is their rightful place among the country's new aristocracy. Some also show signs of becoming permanent students highly qualified but not contributing to the society.

Education

Typically, schooling in the region comprises around 7 years for primary and five years for secondary level. We consider the saturation levels (ie percentage of age group completing that level) for years 10-12 to be about 65%, and for year 12 only to be about 50%. Technical training for those aged 15-19 has a saturation level of around 20% of age group. The levels indicated relate to South African statistics up to 1975; we consider this a fair basis for comparison on realistic aspirations of development.

Tertiary studies include Universities, Polytechnics and various high-level vocational training colleges.

In Botswana, a supplementary Pre-entry Science course is required for those proceeding to courses requiring good science and maths backgrounds, and two years university study in Botswana is required prior to proceeding abroad for courses not available in Botswana.

For Botswana, 1989/91 saw about 90% receiving primary education, 60% secondary, university 1989/90 enrolment including pre-entry science was 2700; 1997 target is 6500.

* data from NDP

In this context it is easy to see why the development of education takes precedence over most other components of our region's development plans,as well as why the resources which can be allocated for it fall far short of what is needed.

Higher education has a particularily important role to play and is seen as the "engine which pulls the train". While not in any way disagreeing with the basic logic of this approach, we feel that better use of resources which could be achieved in the sphere of higher education could have an important impact on education as a whole. If, through increasd funds, better education was provided at primary and secondary levels, as well as vocational training, not only would there be an improvement in the quality of higher education, but also the "train" could begin to be partly self-propelled.

The social benefits of improved primary and secondary education are particularily important in a region undergoing such swift and profound economic and social change. The population's ability to become more than passive spectators has to be improved and understanding of the forces governing peoples lives has to be fostered if culture and self-esteem are to be preserved and developed.

The priority assigned to various fields of the economic and social development process should be reflected in the academic planning. What should, however, also be taken into account is the fact that as our region does not exist in isolation and that the process of building up of our higher education system is, of necessity, a very gradual one. External help is and will continue to be needed for many years to come. Specialists in subjects with a relatively limited social or cultural content can continue to be imported form other regions for a long time to come without any drastically negative effects, while others, whose field of expertise is closely related to local conditions, such as architecture, should be trained locally.

Coincidentally, this also seems to make good economic sense, as many facilities devoted to training of students in advanced sciences and technology are also the most expensive ones in terms of specialised buildings and equipment.

Programmes for regional co-operation in the field of higher education should be developed or strengthened, thus removing the unnecessary burden of providing a full range of higher educational opportunities on every individual country.

Courses should be provided that can make use of the existing institutions, whose potential for training and education should be maximised.

Part-time courses should be given a higher priority,thus giving more students the opportunity of financing their own higher education.

Courses of long duration should be, whenever possible, split up into smaller components so that studying could be interrupted with periods of work, which would not only make it financially easier for the students, but also allow for some practical application of newly aquired expertise.

←The tertiary facility

←Academic plan

The staff employed by our higher education facilities are often recruited in the developed world and bring with them demands for excessively high standards as pre-conditions for their employment.

* more words

The project team

The architects of our region, while possibly as well trained as any, are often considered by the client not to be quite equal to the task of planning and designing something as big and complicated as a university. The result is that foreign firms are often invited to do the job. Those foreign firms are, and reasonably so, chosen for their experience in designing facilities of a similiar nature. Unfortunately, they often apply a number of "stock solutions", perceiving the problem to be mostly of functional or aesthetic nature. However, while this may be the case in the Developed world, this is decidedly not so in our country.

As mentioned before, because of the scale of the undertaking as well as the perceived national importance of the institutions of higher learning, in most cases it is the government that is the client.

In addition to the specific disadvantages of having a government ministry or department for a client, where many problems arise out of perceived higher status of any government employee over any other person,all the usual disadvantages of having the client who is not the user are present.

The most negative result of this often less than satisfactory relationship between the architect and the client is usually lack of a coherent brief. Although it is perfectly understandable that there may not be sufficient expertise or experience within the client body to prepare such a document, this lack is very often not recognised or acknoweleged, nor is the necessary expertise allowed to be imported, usually for financial reasons.

In the case of a brand new institution being planned, the academic appointments have usually not yet been made, which makes arriving at a detailed brief * impossible.

The choice of architect, whether local or imported, often leaves much to be desired. Local architects sometimes get government commissions as a result of a rota system which, while seemingly fair, is often simply a way of avoiding making potentially contentious decisions by the client. The decision is obviously easier in the case of expansion of an existing facility, or where the system has been in existance for long enough to give the local architects a chance to become specialised. When imported architects are commissioned, it is often for reasons of their "star quality", where the chances are that the architects main concern may be to perpetuate this image,rather than to find appropriate solutions to a local problem.

As it can be said that a good building is a product of not only a good architect, but a good client and a good relationship between the two, it is most important that this be achieved. Following are some recommendations which we feel would improve the situation in this respect and, hopefully result in good i.e. appropriate solutions:

The client body should, whenever possible, be composed of not only of the financial backers but also of educational specialists, members of the academic staff, administration, housekeeping, maintenance and students, all of whom should be quided and advised by an independent, possibly accomplished and locally experienced architect/planner. The region has a number of established higher education facilities, whose own planning units employ number of persons fitting this description.

The firm/s of architects should be selected through a competition for an overall masterplan, with the brief for that competition having been prepared by the client body, as describrd previously. The jury should be composed of selected number of representatives of the client body, with an additional, regionally recognised architect.

The more detailed brief for the individual buildings and external spaces should be developed with the participation of the architect chosen for the master plan, and of future members of the faculty and staff. If such appointments have not yet been made, or if their experience is limited, external specialist consultants should be brought in, though their influence should be moderated by persons with local expertise.

If the scope of the project is too large for any one architectural firm to handle. it should be allowed to enter into an association with other practices, preferably with the runners-up in the competition, in order to maintain control over the entire project. This kind of authority can be given to a practice only if the aims and objectives of the winning master plan are very clearly defined and satisfy an equally carefully designed brief.

Analysis of requirements

Functional analysis.

Space structuring
- Growth pattern
- Room size frequencies
- Noise zoning
- Proximity chart
- Space requirement generation

Circulation & access
- Disabled

Environment

Thermal/ventilation, sound, lighting and hazard criteria
Services
Fittings
Building & design control regulations: applicability versus cost

Our institutions of higher learning, by virtue of having a substantial residential component tend to function as communities. This function should be recognised and the positive aspects of this feeling of community should and can be reinforced with appropriate planning. What we feel should not be emphasised is the difference between this and all the other existing communities. Exclusivity breeds without any help from the planners.

Site criteria

1. Choice of site. Although this decision is usually made at an early stage and for reasons often unrelated to its suitability for the purpose, we feel that it would be an improvement if the brief required the competition entrants to make a choice between several sites, which could be available, a situation still possible in our region where large pockets of land are still being held either by the central or local government. This choice should be well justified, with the quality of the justification being a fairly good indication of the architects' grasp of the overall impact and significance of the proposed development. The brief should be specific about the initial size of the project, its envisaged rate of development and its final or optimum size. The growth aspect is of particular importance in our situation and should be dealt with decisively in this initial stage.

Use of site. Although the cost of land is still comparatively low, it is a finite resource and as such should not be allowed to be wasted. An optimum density should be arrived at, which on one hand limits the necessity for use of mechanical lifts, while on the other leaves a sufficient amount of open space for light, ventilation and other uses.

Our climatic conditions permit extensive use of outdoor spaces, which can be enhanced with a minimum of intervention. This makes considerations such as comfortable walking distances quite specific to our situation. The existing patterns of social interaction also increase the value of open space as a venue for socialising. Full use should be made of any possibilities thus afforded.

Preparation of brief

As described in the previous section, the brief becomes the single most important input into a succesful design. It should be prepared in several stages with various carefully defined degrees of detail. The amount of research necessary for its sucessful formulation should be foreseen and budgetted for. Any attempted savings at this stage are likely to result in increased expenditure later.

Potential use of existing buildings. Although our region does not abound in buildings which have outlived their uses, the idea of using existing buildings, even if already occupied by another institution is being used. The advantages seem to outweigh the discomforts with the main benefits being: a. the actual teaching can begin much earlier than if it had to wait for the completion of the building programme, and

b. the staffing is completed in time for the staff members to be given their say in the formulation of the detailed requirements for their respective departments.

Material consumption

We are not generally in a position to run sophisticated energy generation schemes. Universities use the public utilities for electricity, water, drainage and solid waste removal, with the exception of medical training facilities with incinerators.

* words here

Design

Design considerations which should be derived from the brief are:

a. spatial
b. financial, including running costs and cost of maintenance
c. functional
d. site-related
e. energy use-related
f. growth-related

What the brief cannot try to dictate is:

a. aesthetics

a. cost
b. energy efficiency
c. ease of maintenance
d. aesthetics

Design criteria

Materials

Construction

* words here

Maintenance

* words here < frank

Conclusion

* words here

References / Appendices

Ewa Gurney and David Young

cc: SADCC UA
BIDP AI
IAZ

UIA2
IN SEARCH OF THE APPROPRIATE.

A view from Southern Africa.

Introduction

Appropriate: 'suitable' or 'proper' from the Latin root 'own'.

The notion of appropriateness, although it has been with us as long as the word for it, has only begun to be applied to architecture relatively recently. This is not because we have only now realised that an appropriate thing is better than an inappropriate one, but because our appetite for and ability to produce inappropriate solutions has increased greatly while, at the same time, in parts of the world, inappropriate solutions have become a luxury which we can no longer afford. The search for the appropriate has not been made any easier by the fact that the complexity resulting from increasing economic technical and cultural interdependence is sometimes beyond the understanding of decision-makers, while the sheer pace of development required imposes on us a timetable in which there is often no room for the research necessary for identifying the appropriate solution.

The above is doubly true for the developing world. Not only has the notion of appropriateness come to us late, but it also often came not as a notion, but as a ready-made "appropriate solution". It is amazing how few people realise that "appropriate solutions" do not travel well.

Although great strides are being made in our region in many aspects of development, the design of higher education facilities seems to pose a particular problem as far as appropriateness is concerned. The reasons for this situation seem to be the following:

Our higher education is modelled on an academic world culture, tending to spread from the developed to the developing world. To a relatively unsophisticated public, social function is often associated with built form, and with the buildings of the developed world, being far better illustrated than those in the third world, the image of the desirable and correct facility tends to be the first world model, however inappropriate it may be for our region's climate or economic situation.

Governments tend to favour styles and monuments regardless of efficacy and economy,

It is a common fault of clients that they do not understand that architects are trained to solve any design commission; it is a not uncommon fault of architects that they fall into a routine rut and cannot rise to the challenge of an uncommon commission. A resulting tendency is for a regional client to call in external experts, possibly selected because of their media stardom. Such experts not unusually arrive with packages or prejudices which exclude the appropriate from the true list of priorities.

Architects often find it quite difficult to enter into dialogue with economists regarding the resources and characteristics of our region, while at the same time being as tempted as any to design and build monuments.

The context

The region

The ten SADC countries define the southern Africa region for the purposes of this discussion, but we also make reference to data for subsaharan Africa and Botswana. The states in the SADC region are fairly new, and have tended to have their governments control and direct their economies and educational systems. Past political instability has hampered progress. There presently appears to be a spirit of cooperation to a greater degree than previously, which may lead to more genuine economic links being permitted. The region has low gnp, and undeveloped human resources are the main reason, despite substantial natural resources.

Education

Typically, schooling in the region comprises around 7 years for primary and five years for secondary level. Tertiary studies include Universities, Polytechnics and various high-level vocational training colleges. Higher education is seen as being of paramount importance for Africa's future, Subsaharan university enrollments have grown from 1200 in 1960 to 440 000 in 1983, but present indications are that the present structure is unsuitable and the efficacy of the systems is questionable.

Resources

The region is characterised by unpredictable climatic conditions, undeveloped or undervalued natural resources and, above all, underdeveloped human resources.

Teachers are generally in short supply; staff development in Africa at tertiary level is lagging badly. Facilities, funds and staffing are generally inefficiently structured.

Given this, the pace of development required, multiplied by a 3% population growth rate and the need to satisfy the most basic of human needs is not being achieved, despite the fact that certain states have excessive numbers of graduates in certain fields.

Targets

For Botswana, the defined national objectives are democracy, development, self-reliance and unity. Planning of development has the objectives of sustained development, rapid growth, economic independence and social justice. While short term fluctuations in emphasis occur, the aim is to balance all of these in the longer term. This is not untypical of states in the region.

In the educational sphere, recent deterioration is reducing the capacity of Africa's tertiary institutions to contribute to regional development. These establishments must have their quality restored and then improved to allow the region to make its own best uses of the rapid advance of science and technology. Most states, however, will first need to rearrange their systems to fit present changed economic circumstances before moving on to improvements. Institutions, campuses, departments and programmes need to be

combined into larger, more viable units. Staffing, in particular academic but also non-academic, needs to be reduced while upgrading levels of relevant training and experience. Student numbers need to be stabilised by increasing entry and performance requirements while introducing the notion of real costs for board and lodging, this being mitigated for genuine cases of need. From this, a sound base would be established to expand necessary graduate numbers and the scope of the research and community activities presently struggling to survive. The utilization of existing facilities and the planning of new ones is an integral part of such restructuring.

Although the advantages of appropriate solutions seem self-evident, we would like to highlight the penalties imposed on our region by this often unconscious preference for the inappropriate ones. These costs, while mostly hidden, are becoming unsupportable to our resource-starved economies and social systems.

Proportionally high expenditure on higher education deprives other, often more necessary levels of education of the necessary funding.

~~* data from NDP~~

Within higher education, the proportionally high expenditure on buildings depletes higher educations budget with the result that there are insufficient funds for the proper running of the facility.

~~* data~~

Inappropriate design with regard to climatic controls often commits the institutions to ever mounting costs of purchasing, running, maintaining and replacing of mechanical climate controlls, while a lot of unnecessary use of sophisticated materials, construction methods and finishes makes it necessary to employ specialised or highly skilled construction and maintenance labour, which often needs to be imported and which, even if locally available, does not come cheap.

The widening gap between the rich and the poor, while acceptable to most on the rich side, is not part of our Governments stated aims and objectives, and yet it can be seen as a result of the continuous over-provision for the needs of the upper strata of our societies.

~~* data from NDP~~

The graduates of higher education institutions often either leave for richer countries in search of the high standard, to which they have become accustomed, or stay on only to take up what they think is their rightful place among the country's new aristocracy. Some also show signs of becoming permanent students highly qualified but not contributing to the society.

The tertiary facility

Adverse economic conditions bring the need for appropriate solutions into sharp relief. The search for such solutions should be equally rigorous at each level of planning.

Academic plan

Various historical and social phenomena have created a number of models, thorough understanding of which is necessary in deciding whether any one of

those is applicable, or whether the project is without precedent. This, in turn, calls for an in-depth understanding of the context i.e. the role that is, should be and could be played by the institutions of higher learning in our society. As this is to a certain extent a political decision, politicians should be expected to participate in its making. Their influence should be moderated by those professionally involved in academic, social and related developmental issues.

Higher education has a particularily important role to play in the society, and is seen as the "engine which pulls the train". While not in any way disagreeing with the basic logic of this approach, we feel that better use of resources in the sphere of higher education could have an important impact on education as a whole. If, through increased funds, better education was provided at primary and secondary levels, as well as better vocational training, not only would there be an improvement in the quality of higher education, but also the "train" could begin to be partly self-propelled.

The social benefits of improved primary and secondary education are particularily important in a region undergoing such swift and profound economic and social change. The population's ability to become more than passive spectators has to be improved and understanding of the forces governing peoples lives has to be fostered if culture and self-esteem are to be preserved and developed.

The priority assigned to various fields of the economic and social development process should be reflected in the academic planning in order to correct present imbalances. Also to be taken into account is the fact that our region does not exist in isolation and that the process of building up of our higher education system is, of necessity, a very gradual one. External help is and will continue to be needed for many years to come. Specialists in subjects with a relatively limited social or cultural content can continue to be imported from other regions for a long time to come without any drastically negative effects, while others, whose field of expertise is closely related to local conditions, such as architecture, should be trained locally.

Programmes for regional co-operation in the field of higher education should be developed or strengthened, thus removing the unnecessary burden of providing a full range of higher educational opportunities on every individual country. Consideration must also be given to rationalising existing facilities, departments and teaching programmes to improve their viability.

Courses should be provided that can make use of existing employers, whose potential for training and education should be maximised.

Part-time and distance courses should be given a higher priority,thus giving more students the opportunity of financing their own higher education, while utilization of physical facilities should ensure year-round use.

Courses of long duration should be, whenever possible, split up into smaller components so that studying could be interrupted with periods of work, which would not only make it financially easier for the students in a more market-oriented milieu, but also allow for some practical application of newly acquired expertise.

The scope of the grown facility must be clearly and realistically considered in order to properly plan for growth.

The project team

The architects of our region, while as well trained as any, are often considered by the client not to be quite equal to the task of planning and designing something as big and complicated as a university. The result is that foreign firms are often invited to do the job. Those foreign firms are, and reasonably so, chosen for their experience in designing facilities of a similiar nature. Unfortunately, they often apply a number of "stock solutions", perceiving the problem to be mostly of functional or aesthetic nature. However, while this may be the case in the developed world, this is decidedly not so in our region.

The choice of architect, whether local or imported, often leaves much to be desired. Local architects sometimes get government commissions as a result of a rota system which, while seemingly fair, is often simply a way of avoiding making potentially contentious decisions by the client. The decision is obviously easier in the case of expansion of an existing facility, or where the system has been in existance for long enough to give the local architects a chance to become specialised. When imported architects are commissioned, it is often for reasons of their "star quality", where the chances are that the architects main concern may be to perpetuate this image,rather than to find appropriate solutions to a local problem.

As mentioned above, because of the scale of the undertaking as well as the perceived national importance of the institutions of higher learning, in most cases it is the government that is the client. In addition to the specific disadvantages of having a government ministry or department for a client, where many problems arise out of perceived higher status of a government employee over any other person, all the usual disadvantages of having the client who is not the user are present.

The most negative result of this often less than satisfactory relationship between the architect and the client is usually lack of a coherent brief. Although it is perfectly understandable that there may not be sufficient expertise or experience within the client body to prepare such a document, this lack is very often not recognised or acknoweleged, nor is the necessary expertise allowed to be imported, usually for financial reasons.

As it can be said that a good building is a product of not only a good architect, but a good client and a good relationship between the two, it is most important that this be achieved. Following are some recommendations which we feel would improve the situation in this respect and, hopefully result in appropriate solutions:

The client body should, whenever possible, be composed of not only of the financial backers but also of educational specialists, members of the academic staff, administration, housekeeping, maintenance and students, all of whom should be guided and advised by an independent, accomplished and locally experienced architect/planner. The region has a number of established higher education facilities, whose own planning units employ number of persons fitting this description. In the case of a brand new institution, the academic appointments have usually not yet been made, which makes arriving at a detailed brief without clear competent guidance from experienced academics impossible.

It is often of benefit to have the firm/s of architects selected through a competition for an overall masterplan, with the brief for that competition having been prepared by the client body, as described above. The jury should be composed of selected number of representatives of the client body, with an additional, regionally recognised architect.

The more detailed brief for the individual buildings and external spaces should be developed with the participation of the architect chosen for the master plan, and of future members of the faculty and staff. If such appointments have not yet been made, or if their experience is limited, external specialist consultants should be brought in, though their influence should be moderated by persons with local expertise.

If the scope of the project is too large for the winning architectural firm to handle, the selected firm should be allowed to enter into an association with other practices, preferably with the runners-up in the competition, in order to maintain control over the entire project. This kind of authority can be given to a practice only if the aims and objectives of the winning master plan are very clearly defined and satisfy an equally carefully designed brief.

Analysis of requirements

Once the brief is clear, the standards and regulations which are appropriate and/or required must be considered and defined. Appropriateness here is a contentious area, and may be particularly difficult to define in ways that reconcile environment, access, hazard, space and fittings with each other and the financial constraints.

The staff employed by our higher education facilities are often recruited in the developed world and bring with them demands for excessively high standards as pre-conditions for their employment. This factor must be taken into consideration.

A particular requirement, because of the substantial residential component typical in the region, is the need for the institutions to function as communities. This function should be recognised and the positive aspects of this feeling of community should and can be reinforced with appropriate planning. What we feel should not be emphasised is the difference between this and all the other existing communities. Exclusivity breeds without any help from the planners. Isolated sites impose notable extra costs in creating an entire social and municipal infrastructure.

Site criteria

Choice of site: Although this decision is usually made at an early stage and for reasons often unrelated to its suitability for the purpose, we feel that it would be an improvement if the brief allowed a choice between several available sites, a situation still possible in our region where large pockets of land are still held either by central or local government. This choice should be well justified, with the quality of the justification being a fairly good indication of the architects' grasp of the overall impact and significance of the proposed development. The brief should be specific about the initial size of the project, its envisaged rate of development and its optimum size. The growth aspect is of particular importance in our situation and should be dealt with decisively in this initial stage.

Use of site. Although the cost of land is still comparatively low, it is a finite resource and as such should not be allowed to be wasted. An optimum density should be arrived at, which on one hand limits the necessity for use of mechanical lifts, while on the other leaves a sufficient amount of open space for light, ventilation and other uses. Our climatic conditions permit extensive use of outdoor spaces, which can be enhanced with a minimum of

intervention. The patterns of social interaction also increase the value of open space as a venue for socialising, and such usage should be promoted wherever possibilities exist.

Preparation of brief

As described in the previous section, the brief becomes the single most important input into a succesful design. It should be prepared in several stages with various carefully defined degrees of detail. The amount of research necessary for its sucessful formulation should be foreseen and budgetted for. Any attempted savings at this stage are likely to result in increased expenditure later.

Although our region does not abound in buildings which have outlived their uses, the idea of using existing buildings, even if already occupied by another institution, should be considered. The advantages seem to outweigh the discomforts with the main benefits being that the actual teaching can begin much earlier than if it had to wait for the completion of the building programme, and that the staffing is completed in time for the staff members to be given their say in the formulation of the detailed requirements for their respective departments.

Higher education facilities are usually commissioned by the state governments, whose desire to build monuments to themselves is certainly not without precedent all over the world. While we accept the idea of the necessary monument, the scale and nature of national universities, like national airlines, is often a matter of pride rather than necessity. Many of the educational needs of our region could be more economically satisfied at a regional level. Political and tribal considerations also have a history of overriding real needs.

Services

We are not generally in a position to run sophisticated energy generation schemes for a campus. Universities use the public utilities for electricity, water, drainage and solid waste removal, with the exception of medical training facilities with incinerators. Appropriate here relates more to suitable thermal design and minimising of artificial illumination, as well as to ensuring that there is space and access for easy maintenance of the municipal services. There is a need to design for fault tolerance in situations where services/maintenance are in question.

Design

The architect engaged in developing a brief targetting appropriateness is likely to carry this attitude through to the design stage. The final product should thus avoid paying mere lip-service to the idea. Application of the idea should also tend to produce some design consistency in the developing campus in reflecting local resources and climate.

Construction and maintenance

Preference should be given to common or popular construction methods, materials and components.

SADCUA file

Critical in maintaining academic standards is the ability to obtain spare parts for maintenance and repair of equipment, routine replacement, upkeep and upgrading of plant, utilities, vehicles and equipment, and supplies of necessary consumables. [Quote Mr X document]

Conclusion

Africa needs to use its resources far more effectively, and we believe that appropriate development of tertiary education facilities can make a notable contribution.

Ewa Gurney and David Young

cc: SADCC UA
BIDP AI
IAZ

Appendices
References

6

Preparation for Responsibility: Higher Education

Higher education is of paramount importance for Africa's future. Africa requires both highly trained people and top-quality research in order to be able to formulate the policies, plan the programs, and implement the projects that are essential to economic growth and development. Preparing individuals for positions of responsibility—in government, in business, and in the professions—is a central role of the continent's universities; supporting these individuals in their work—with research, advice, and consultancy—is another equally important role.

The leadership of the region's institutions of higher learning has spoken forcefully and eloquently at meetings in Mbabane in 1985 and Harare in 1987 about the urgent need for these institutions to produce graduates who can tackle the complex problems that confront the continent. Pronouncements at these meetings were consistent with the aspirations and African-articulated policy framework enunciated by the Organization of African Unity in its *Lagos Plan of Action for the Economic Development of Africa 1980–2000* (1981) and in its *Africa's Priority Programme for Economic Recovery 1986–1990* (1985) and endorsed by the United Nations General Assembly in its *Programme of Action for African Economic Recovery and Development 1986–1990* (1986).

University programs of research and teaching that support the rehabilitation and further development of the agricultural sector are particularly important within the framework of the *Lagos Plan of Action.* These programs include many applied areas, such as soil and water conservation and drought and desertification control, and the natural science and engineering disciplines upon which progress in all such applied areas depends. Of equal importance to Africa's future is its capacity to plan and direct the process of development. To achieve this capacity, Africa's institutions of higher learning must produce manpower trained in the disciplines of the social sciences and management, conduct timely research, and provide advisory services in such fields as economic planning, finance (including debt management), and public administration.

Although these tasks are essential to growth and development, they cannot be accomplished unless fundamental changes are made in higher education—changes that will dramatically improve its quality. If African universities are to provide graduates, research, and services that can respond adequately to the demands of Africa's modernizing societies—if they are to produce the research scientists and university teachers who can interpret the latest technology and harness it for the African continent—then resources for higher education must be increased, and they must be used more productively.

This study contends that resources can be increased and used more efficiently to improve the quality of higher education, despite limited economic prospects and the unremitting need for public austerity. It also suggests that the successful implementation of policies to improve higher education may eventually help to ease the constraints on educational

development at the lower levels. Higher education in Africa can be adjusted to serve changing imperatives for development, and that adjustment need not be at the expense of priority objectives in other subsectors.

The Challenge and the Promise

The development challenge posed for tertiary education is in one important respect more daunting than that posed for lower levels. The real growth of public resources for the education sector as a whole in most countries is unlikely to keep pace with the growth of school-age populations, which is likely to mean a decrease in real expenditures per capita on public education. Even with the vigorous application of recommended reforms, the primary and secondary levels of the education system will require additional resources just to keep enrollment rates and quality standards from deteriorating from their current modest levels. But if public resources for education are at best constant in real terms, where will the additional resources for primary and secondary schooling be found?

A portion of those resources can appropriately be supplied by the private beneficiaries of primary and secondary education and their families. It is probably inevitable that parents' contributions to the costs of their children's education, particularly secondary education, will increase, despite concerns about how this increase will affect overall equity and efficiency. But, even with greater private contributions, education systems will not be able to ensure the increased stocks of human capital required for continued development, especially in those African countries where enrollment rates are lowest and where the expansion of access to primary and secondary education remains an urgent priority.

The conclusion is harsh and inescapable: to meet minimally acceptable targets for coverage and quality of lower levels of education in most countries, the share of stagnant real public education expenditures devoted to tertiary education cannot expand further and in some cases may have to contract. Savings must be sought at this level from improvements in efficiency, increases in private contributions, and constraints on the growth of output. Total savings from such measures, plus resources mobilized from the international community, must generally be sufficient to finance the indispensable improvements in quality in the tertiary subsector in the short run, as well as its expansion in the long run. In some cases, such as the Sahelian countries where the crisis in primary and secondary coverage is most acute, these savings may need to be substantial enough to free up funds for the lower levels as well.

It will take years of dogged determination and profound changes in the way higher education is organized, managed, and financed to achieve the needed savings. In particular, unless managers of higher education are presented with compelling incentives to improve efficiency, impose quantitative limits on enrollments, and mobilize resources from the private sector, the required savings will not materialize. The most powerful incentive is to ensure that savings realized through wise and courageous leadership in any specific institution are in significant measure available for redeployment in the same institution. Conversely, policies that expropriate savings obtained by sacrifice in individual institutions and transfer them to a central authority for redistribution will be self-defeating because they destroy the incentive to look for savings. Until those savings are obtained, the limits on quality at the tertiary level and on coverage and quality at both the primary and secondary levels will be tighter, and the long-term prospects for development in Sub-Saharan Africa more constrained, than need be.

The challenge, then, is to design and implement with persistence, over many years and in circumstances of severe austerity, policies that generate the resources needed to revitalize the subsector. If the challenge can be met, these policies can increase the contributions of higher education to national development in three critical ways.

First, tertiary institutions prepare the people needed to fill high-level scientific, technical, professional, and managerial jobs—that is, they educate the elite leadership of a nation's development effort. Of special importance is the preparation of teachers, scholars, and managers for the education sector itself, especially for its most advanced teaching and research functions. These people are the core of national capacity for producing trained manpower, setting standards, maintaining quality, and adjusting the education system to changing circumstances. Second, African countries look to higher education institutions to generate the knowledge and innovation needed for development, through indigenous scientific research and as agents for the acquisition, adaptation, and dissemination of scientific and technical knowledge developed elsewhere. Third, African universities as institutions and their faculties as individuals can provide necessary services needed for development in both the public and private sectors.

In addition, tertiary education in Africa as elsewhere is a source of analytical perspective on social problems and their possible solutions that is independent of and, often, a usefully pluralistic counterpoint to political and religious authorities. Higher educa-

tion institutions also encourage indigenous self-expression, conserve and adapt local traditions and values, and constitute important symbols of national prestige and attainment.

Issues in Higher Education

At least with respect to the preparation of high-level personnel, tertiary education's contribution to Sub-Saharan African development since independence has been remarkable. The rapid growth of universities and enrollments was sketched earlier (chapter 1). In 1960 tertiary institutions in Africa graduated about 1,200 degree and nondegree holders, equivalent to one person trained at that level for each 168,000 inhabitants; the 70,600 graduates in 1983 represented a ratio of one per 5,800 inhabitants.

With this notable easing of the high-level manpower constraint, however, the relative importance of tertiary education's other functions has increased. Today, higher education's continuing contribution to development is threatened by four interrelated weaknesses. First, the mix of outputs of the higher education system is no longer well suited to the requirements for development. Second, the quality of those outputs shows signs of having deteriorated; in many instances the fundamental effectiveness of the outputs may be in doubt. Third, their costs of production are needlessly high (where cost is measured as the other output forgone because resources currently going to higher education were not applied elsewhere in the educational or economic system). Finally, the financing of the outputs is socially inequitable and economically inefficient.

The comments in this chapter on the costs and financing of higher education are based on robust empirical evidence. Findings on the outputs of higher education, however, must be offered more as hypotheses worthy of further study in individual countries than as incontrovertibly demonstrated facts. Except for simple head counts of graduates, there is presently a dearth of reliable data on the levels of outputs from the higher education system and especially on changes in those levels over time. African governments and their international partners in development should launch the necessary activities to generate and analyze data and should be prepared to act promptly on their results.

Inappropriate Mix of Outputs

HIGH-LEVEL MANPOWER. Of the three principal outputs of tertiary education—high-level manpower (including scholars and teachers for the education sector itself), knowledge and innovation (research), and development advisory services—Sub-Saharan Africa today generally produces relatively too much of the first and not enough of the second and third.

The proportion of tertiary graduates in African populations of age twenty-four and older (now about 0.4 percent) is still small compared with other developing regions (on average perhaps 6 percent). The proportion of scientific, technical, and professional positions filled by expatriates remains substantial in many countries, especially in the education sector. Over the long run, Africa can survive and prosper only by fully developing its major resource, people, especially those with skills acquired in tertiary education.

Nevertheless, short- to medium-term overproduction of high-level manpower—at least of the requisite quality—is suggested by the growing problems of unemployment and underemployment among graduates. Although reliable figures are not generally available, recent conversations with officials of African ministries and universities points overwhelmingly to surpluses of manpower trained at the tertiary level. Other considerations (such as physical capital stock) aside, the incidence and size of the surpluses are likely to be greater in countries such as the Congo, Gabon, Guinea, Lesotho, and Swaziland, where about one of every 2,000 inhabitants was awarded a degree from tertiary institutions in 1983, than in Burundi, Mozambique, or Tanzania, where the rate of production of tertiary graduates in recent years was only about one for every 17,000 inhabitants.

Data problems notwithstanding, long and lengthening periods of job search have been reported among graduates in Nigeria and Zaire. In Kenya a 1985 longitudinal study of University of Nairobi graduates between 1970 and 1983 documented job searches lasting from one to three years and in addition found that over the course of the study graduates became more likely to accept temporary employment and less likely to use their formal training on the job. Manpower forecasts for Lesotho show an excess of graduates, particularly outside the teaching profession. In Somalia demand for tertiary graduates around 1990 is estimated at 150 annually, although the anticipated output of Somalian institutions, net of students returning from abroad, is more than five times that amount. Fewer than 15 percent of the approximately 1,100 graduates of tertiary institutions in Mali in 1986 can expect to find employment in the public sector, and private sector opportunities are certainly no greater; the conclusion is that at most 30 percent of the graduates will find work appropriate to their level of training. If the base for these figures were to include Malians returning

from training abroad, the picture would be even gloomier. In Guinea a 40 percent reduction in enrollment in higher education was deemed necessary to bring the annual production of graduates in line with the absorptive capacity of the public service, essentially the only employer of high-level manpower.

What accounts for this situation, now an essentially universal phenomenon on the continent? Several hypotheses are worthy of testing in the light of country-specific circumstances.

To some extent, the apparent surpluses represent not so much overproduction as a general failure by African countries to nurture conditions in which individuals with tertiary education can be productive. Political philosophies and development models that place primary reliance on the reasonably unfettered interplay of market forces, internally and internationally, generate by their very nature incentives that reward skills acquired in tertiary education. As African economies succeed in their efforts at liberalization through structural adjustment, their ability to get the most out of high-level manpower will be enhanced. However inevitable it may turn out to be, this increase in the capacity of African economies to use high-level manpower productively is unlikely to become noticeable before the end of the century. If recent experience is any guide (see box 6-1 for a case in point), structural adjustment in the short run exacerbates rather than ameliorates the problem of unemployment among graduates, especially since the graduates' aspirations about occupational status and wages are much slower to respond to new economic parameters than the demand for their high-level skills.

The more immediate explanation for the surplus is that, on the one hand, the demand for graduates contracted suddenly in both the public and private sectors. The economic downturn of the 1980s and the pressure to contain public employment arrived just as African civil services, almost everywhere the largest employer of high-level manpower, had largely completed the process of replacing expatriates with newly qualified nationals and were consequently reducing their hiring rates. Other aspects of adjustment to the downturn—including the retreat from import substitution as a strategy for industrialization, the shift away from nontradables (construction, bank-

Box 6-1. Employment and Earnings of University and Technical Graduates in Côte d'Ivoire

Between 1982 and 1984 Côte d'Ivoire experienced a severe recession that reduced GNP per capita by almost 50 percent. Many jobs were lost, especially in the modern private sector, but the system of higher education was not able to adjust sufficiently to accommodate the changing demand for its graduates. A 1985 survey in Côte d'Ivoire revealed that 37.5 percent of people with university diplomas in Abidjan and more than half of such people in other cities were economically inactive or unemployed. More than half of them had been in that situation continuously for the full year before the survey. Among people with vocational and technical diplomas, the situation was only marginally better: 33 percent of them were without jobs in Abidjan, and 26 percent in other cities. The reduced ability of the formal sector—the traditional outlet for university and technical graduates—to absorb such graduates, especially in Abidjan, has induced about 10 percent of them to take up work in the informal sector, mainly as self-employed entrepreneurs.

For those graduates who do find jobs in the formal sector, the private returns to their education are still quite high. Each year of postsecondary schooling adds an average of 17 percent to an employee's earnings. This figure is higher in Abidjan (19 percent) than in other cities (15 percent). For technical and vocational education, the increase in earnings is about 9 percent for each year of schooling, with no difference between Abidjan and other cities. Such elevated returns to education in combination with high unemployment among university and technical graduates are signs of an imperfectly functioning labor market. In particular, it appears that, as a result of the recession, the number of jobs has been reduced while the salary levels of those workers still employed have been maintained.

Graduates who become self-employed in the informal sector sometimes earn even more than their wage-employed peers. For example, in Abidjan, the average self-employed person with a vocational or technical diploma earns an income almost one and a half times that of a government worker with the same diploma and more than three times that of a self-employed person with only a primary school diploma.

These findings suggest the importance in the short run of adjusting university output to levels that the labor market can absorb. At the same time, they point to the need for adjustment mechanisms that will eventually allow full (or fuller) utilization of university graduates as the economy recovers and as labor market performance improves. The high productivity of graduates working in the informal sector, in particular, indicates that (even though new graduates may have to adjust occupational expectations downward) college education is of broad vocational value.

ing, insurance), and the scrutiny of staffing levels following privatization of parastatals—may also have slowed private sector demand for high-level manpower, which in any event was often much less significant than demand from the public sector.

On the other hand, the economic downturn coincided with the coming into production of the remarkable program that was undertaken in the 1970s to expand the capacity of tertiary education. Between 1980 and 1983 enrollments in African institutions of higher education increased 30 percent (from 337,000 to 437,000, not including the additional 100,000 African students enrolled in foreign universities) and graduates increased 70 percent (from 41,500 to 70,600). In short, the supply of graduate manpower mushroomed.

In addition, the emerging imbalance between supply and demand was exacerbated by structural rigidities in the education system. A good example is the remarkable stability in the relative number of graduates in the arts, humanities, and soft social sciences. In 1960, reflecting the need for indigenous administrative personnel and the less onerous requirements for costly facilities in liberal arts programs than in the sciences and engineering, African institutions of higher education enrolled 60 percent of their students in the arts and humanities and 40 percent in the sciences and engineering. Today, the Africanization of public service positions and (at least in some places) of management positions in the private sector is quite advanced, and as a consequence the demand for arts and humanities graduates is less robust. By contrast, the demand for high-level manpower in scientific and engineering professions is, in most places, much more substantial. Yet the 60 to 40 ratio is the same as it was in 1960. Enrollment patterns have not responded to shifting labor market demands. The rigidity of enrollment patterns is further accentuated by the lower proportions of students actually graduating in the sciences and engineering than in the arts and humanities.

In a few countries unemployment and underemployment among graduates of programs in the agricultural sciences, the physical and life sciences, and engineering suggest that, in addition to structural rigidities in enrollment patterns, the overall size of the system may have exceeded the current requirements of economic growth. The continuing reliance on expatriates to staff scientific and technical positions, especially in the education sector itself, suggests that inadequate quality may also impede the absorption of graduates of African universities into the labor force.

Finally, public subsidization has so far kept the direct costs of higher education close to zero for the individual student. Yet, as tables 6-1 and 6-2 make clear, wage differentials remain substantial for labor trained at tertiary institutions. As a consequence, the private rate of return to tertiary education is on the order of 30 percent, higher than for any other region of the world, and it shows no sign yet of decline. In response, the number of secondary school leavers with hopes of acquiring higher education grows larger each year. The result is a paradox of more graduates in many fields than the economy can usefully absorb, combined with undiminished pressure to expand opportunities for higher education.

LEADERSHIP IN EDUCATION. Although an overproduction of graduates may now have become the rule in many African countries, an excess demand for

Table 6-1. Graduate Starting Salaries as a Multiple of Per Capita Income in Selected Countries, circa 1979

Country	*Salary as multiple of per capita income*
Gambia	11.1
Ghana	3.6
Kenya	14.6
Liberia	11.1
Sierra Leone	5.1
Somalia	8.3
Tanzania	14.2
Zambia	12.0
Mean	10.0
Median	11.1

Source: International Labour Office (1982).

Table 6-2. Index of Starting Salaries in Public Service by Education Level in Selected Countries, circa 1979 (O level = 100)

Country	*A level*	*Degree level*
Ghana	120	169
Kenya	127	269
Liberia	.	339
Sierra Leone	229	342
Somalia	128	171
Tanzania	148	323
Zambia	116	169
Mean	145	254
Median	128	269

. Not available.
Source: Derived from International Labour Office (1982).

graduates still exists in some fields of study. These include specific scientific and engineering fields, in which focused expansion of capacity in tertiary education will often be required. But usually the greatest exception to the general rule of overproduction of graduates is to be found in the education sector itself. In eighteen countries for which data are available, expatriates constituted on average 35 percent of secondary school teachers at the end of the 1970s (see appendix table C-9); the proportion is much higher in some fields (for example, science, mathematics, and technical education). Despite sizable staff development efforts, including programs for training in foreign countries, many tertiary institutions are still critically short of African staff, especially in the senior academic positions of teaching and research leadership. In Nigeria, which is ahead of most countries in the Africanization of staff, about 20 percent of the teaching positions in tertiary institutions were still filled with expatriates in the early 1980s. Data for ten other countries at the end of the 1970s suggest that expatriates on average filled 50 percent of tertiary teaching posts (see appendix table C-9).[1] And postgraduate programs, especially those involving rigorous research training, remain in their infancy, in part because requisite staff with doctoral qualifications and adequate experience are not available.

Indeed, the least recognized but perhaps, over the long run, the most devastating damage to African higher education since 1980 was to the promising efforts begun in the 1970s to build an indigenous African capacity to produce tertiary teachers, research scholars, and top-flight analytic personnel for the public services. In Nigeria, for example, the erosion of progress will mean that only one-third of the new academic staff required by universities over the next few years is expected to be forthcoming from existing postgraduate and staff development programs. The shortfall is greater, of course, when doctoral-level staff requirements in research and professional occupations outside of universities are also considered.

RESEARCH. Although substantiation depends more on anecdotal than empirical evidence, African university staff uniformly report that research in their institutions withered in the 1980s. As the financial crisis of tertiary education deepened, research budgets were typically subject to early and severe cuts. The feasibility of offering good postgraduate education also declined, since a significant part of postgraduate (especially doctoral) training involves student participation as apprentices in faculty research and ultimately the solo undertaking of a dissertation project.

Stagnation or outright decline in research output and in the capacity to produce future researchers jeopardizes Africa's long-run ability to take advantage of the worldwide advance in science and technology. Africa need not be consistently in the forefront of all scientific and technological advance, and well into the next century a sizable fraction of Africa's Ph.D.s will still undoubtedly be trained in foreign institutions. But the continent nevertheless already needs to increase its capacity to absorb and use new knowledge, and that capacity is in large measure developed through indigenous postgraduate teaching and research programs. For example, advances in genetic engineering and other areas of biotechnology are potentially applicable to problems of plant and animal health in Africa; the impact on production of food crops and on export agriculture could be sizable. The argument can be extended to human health and even industrial processes—and to such areas as microelectronics and materials science (ceramics and metallurgy).

The central point is that without African mastery of the underlying science of such developments and the techniques to adapt them to local problems and conditions, the potential benefits to Africa of these advances will likely be lost in large measure and certainly will be late in arriving. World-class university-based programs of both basic and applied research and of postgraduate education are the breeding grounds for the mastery of science and technology. They are the key to sophisticated consumption of mankind's exploding stock of knowledge. They are a necessary condition for African escape from intellectual dependency. Ironically, no African nation can afford to have such programs in the short run, yet none can afford not to have them in the long run.

CONSULTANCY AND ADVICE. Even in their current depressed and fragile state, universities in Africa represent a nation's largest reservoir of expert knowledge and cosmopolitan experience. And here is another paradox. The continuing demand for expatriate technical assistance from both public and private sector organizations suggests that there is no lack of tasks requiring the highest levels of academic training and professional experience. Yet, with few exceptions, African universities as institutions and their faculties as individuals do not allocate much time and effort to direct service activities, except for special training programs. Much applied work currently undertaken by foreigners could as well be done by African university staff, who in the process would enrich their own research and teaching by gaining more thorough grounding in present-day African realities.

Low Quality

Direct and hard evidence is not available on the quality of the outputs of African higher education. That African graduates may not be as knowledgeable as their peers elsewhere in the developing world may be suggested by results of the Graduate Record Examination: the scores of African students on the verbal, quantitative, and analytic sections are uniformly lower than those of Latin American, Asian, or Middle Eastern students. Although the significance of this finding is subject to varying interpretations, there is no reason to believe that the cultural disadvantage of African students on such foreign examinations is any greater than that of students from other developing regions. The low (and possibly declining) standard in African higher education is now pervasively bemoaned by teacher, student, employer, and government official alike.

Nor could the situation be otherwise, since indirect evidence of a crisis of quality in African education is overwhelming. A tragic consequence of the economic downturn—and of the concomitant constriction in public budgets and reduced access to foreign exchange—has been the virtual disappearance from higher education institutions in many African countries of exactly those inputs that make physical plant and highly trained academic staff educationally productive (see box 6-2).

These inputs include spare parts for equipment maintenance and repair; routine replacement and upgrading of equipment; reagents and other consumable supplies; acquisitions of monographs and multiple copies of textbooks for libraries; subscriptions to scientific journals; functioning computation facilities; maintenance, gas, and oil for vehicles used in faculty research and student field trips; other research support to faculty, including travel; even routine upkeep of physical plant (for example, sanitary facilities and telephone exchanges) and public utilities (for example, sewerage, water, and electricity).

The level of deprivation of these nonsalary operating expenses varies from place to place on the continent, but appendix table A-22 suggests that, on average, less than 2 percent of total recurrent public expenditures on tertiary education is available for these crucial purposes. Campus visits make clear that the situation prevalent into the 1970s has now reversed: the scarcity of nonsalary recurrent inputs, not the number or level of training of academic staff, is today the governing constraint on quality in African higher education in nearly every country.

Box 6-2. The Crisis of Quality in Higher Education

The scarcity of funding for capital investment and nonsalary operating expenses has seriously undermined the quality of education in African universities. The situation at Nigeria's University of Ibadan illustrates the problem.

> For several months now we have been expected to run a physics laboratory without electricity, perform biology and zoology experiments without water and get accurate readings from microscopes blinded by use and age. Chemicals are unimaginably short. The result of all this is a chemistry laboratory that cannot produce distilled water and hundreds of "science graduates" lacking the benefits of practical demonstrations (Osundare 1983, p. 2122).

Ghana provides other examples. At the University of Science and Technology, no equipment for the electrical engineering department has been purchased since 1962, and most equipment in the civil engineering department dates from the 1950s. Such old equipment, including the university's computer, is rarely in working order; it requires regular routine maintenance, including replacement parts, for which funds are not available. The same university has been characterized as "grossly short of... books, paper and food" (Tipple and Tipple 1983, p. 1654). Similarly, reports from the University of Ghana's faculty of science tell of shortages of chemicals and other consumables necessary for laboratory classes and note that the scarcity of foreign exchange precludes the supply of essential materials from abroad. Lack of funds also means that some universities are operating without the vehicles necessary for field trips and data collection and that others do not have the resources to repair broken telephone systems.

In many countries throughout the Sub-Saharan region, the lack of capital funds has left construction work unfinished on classrooms, laboratories, workshops, libraries, and residence halls. A 1981 report from the Nigerian Commission on Salary and Conditions of Service of University Staff states: "The Commission was horrified to witness the disgraceful spectacle of students in the corridors and outside lecture theatres struggling to comprehend the proceedings inside." Reports from the University of Ibadan are also discouraging: "Everything in the University today points to an agonizing decline. Students swarm from their hostels where there are six in a room designed for two, into a dingy lecture room where a teacher shouts his notes across a hall of five hundred listeners" (Osundare 1983, p. 2122).

The most immediate consequences of the drying up of nonsalary inputs to higher education are that research ceases and instruction is reduced to little more than rote learning of theory from professorial lectures and chalked notes on blackboards. Chemists who have not done a titration; biologists who have not done a dissection; physicists who have never measured an electrical current; secondary science teachers who have never witnessed, let alone themselves actually conducted, the demonstrations central to the curriculum they teach; agronomists who have never conducted a field trial of any sort; engineers who have never disassembled the machinery they are called upon to operate; social scientists of all types who have never collected, or conducted an analysis of, their own empirical data; specialists for whom the programming and use of computers is essential who have never sat before or tested a program on a functioning machine; lawyers who do not have access to recent judicial opinions; medical doctors whose only knowledge of laboratory test procedures is from hearing them described in a lecture hall—qualitatively deprived graduates such as these are now appearing in countries that have been hardest hit by the scarcity of nonsalary inputs. Complicating the situation further in many institutions are student numbers in excess of the carrying capacity of crucial components of the physical plant, particularly living accommodations and library study space.

As a consequence, the skills most relevant to development, those acquired when theory is confronted with the exigencies of the real world, are exactly the ones that do not get learned. The result is that, in its stock of high-level skills and in its ability to generate knowledge and innovation, Sub-Saharan Africa is falling further behind despite the increasing numbers of higher education graduates. Tertiary education discharges ever less effectively its principal responsibilities.

High Costs

Not only does higher education now produce too many graduates in many fields, too few high-level personnel for postgraduate education and research, and not enough research and development advisory and consultancy services. Not only are all those outputs of lower quality than in the past. But the costs per graduate—some of whom are not needed and many of whom are inadequately trained—are exorbitantly high. As a percentage of GDP per capita, which is a reasonable proxy for affordability, unit costs (costs per student-year) of public higher education are between six and seven times more in Sub-Saharan Africa than they are in Asia and nine times more than in Latin America (see table 6-3). As a multiple of the cost of a student in primary school, a plausible measure of opportunity cost, the unit cost of publicly supported students in higher education is about sixty times that of primary students (see table 6-4). In Asia and Latin America, however, unit costs for students in higher education are between ten and fifteen times those for primary students.

There are two parts to this problem of internal efficiency, both reflecting fundamental shortfalls in African higher education. First, wastage—and thus cost per graduate—is high. Data for seven countries suggest that between one-third and two-thirds of the initial entrants to tertiary education fail to complete their studies or complete them behind schedule. Thus, a sizable portion of student places are occupied by repeaters or future dropouts, with the result that

Table 6-3. Unit Costs of Public Education at the Various Levels as a Percentage of Per Capita GNP in Selected Country Groups

Country group	*Primary*	*Secondary*	*Higher*
Sub-Saharan Africa	15	62	800
Francophone	23	86	1,000
Anglophone	12	51	600
Asia			
Southeast Asia and Pacific	11	20	118
South Asia	8	18	119
Latin America	9	26	88
All developing countries	14	41	370
Industrial countries	22	24	49

Source: Appendix tables A-17 to A-19 and Mingat and Psacharopoulos (1985).

Table 6-4. Public Expenditure per Student in Tertiary Education as a Multiple of That at Lower Levels in Selected Country Groups
(medians)

Country group	Tertiary as multiple of primary				Tertiary as multiple of secondary			
	1970	1975	1980	1983	1970	1975	1980	1983
Low-income	68	57	61	60	12	12	18	14
Middle-income	55	50	43	50	7	10	10	7
Francophone	40	55	44	61	9	12	18	13
Anglophone	79	68	50	52	11	11	11	12
Sub-Saharan Africa	55	55	50	59	11	12	14	13

Source: Appendix tables A-17 to A-19.

many more years of student services are required to produce each graduate than the length of the cycle would optimally require. Among the factors contributing to repetition and dropout are: insufficiently developed selection mechanisms for students aspiring to enter higher education (in some countries it remains the case that all who graduate from secondary education are assured a place in higher education); the dearth of nonsalary quality-enhancing inputs (noted earlier), which makes learning difficult, unstimulating, and unrewarding; and the absence of sanctions for poor performance of students and teachers, so there is no incentive to strive hard for results.

Second, resource costs per student-year of higher education services provided are needlessly inflated. Although not uniformly present in every country, several factors typically contribute to the unnecessarily high costs of tertiary institutions borne by the education budget of African nations.

SMALL INSTITUTIONS. Within a sample of fifty African universities at the end of the 1970s, twelve had enrollments under 1,000 students, while only thirteen had enrollments over 5,000 (and several of these had students dispersed over more than one campus). This proliferation of small institutions precludes exploitation of the well-documented economies of scale in higher education (and, in addition, means forgoing the academic advantages of critical mass concentrations of highly specialized staff). Explicit understandings on appropriate divisions of labor—in large countries internally among the tertiary institutions and in small countries across international boundaries—could greatly reduce this cause of high costs.

SUBSIDIES FOR STAFF. In many countries, universities were established initially as self-contained communities on vast tracts of land outside large urban areas. This approach involved heavily subsidized provision to all staff members of housing, standard municipal services, and even welfare and social services (clinics, schools, clubs). The huge sunk costs of this infrastructure prohibit starting afresh, and the ongoing costs of this legacy must somehow be met. With few exceptions, the public budget picks up the tab.

LARGE STAFF. On the basis of personnel listings of approved positions, the ratio of students to academic staff is 13 to 1 in a sample of Francophone African universities and about 7 to 1 in Anglophone Africa, where it ranges from 3 to 1 on the low side to 12 to 1. By way of comparison, the ratio of students to academic staff in British and French universities, in some sense the models for their counterparts in former colonial possessions, is 13 to 1 and 25 to 1, respectively. In some countries, where erosion of salaries and deterioration of working conditions have resulted in an exodus of the most highly qualified academics from the universities, the actual ratio of students to academic staff may be somewhat above the approved ratio. Still, staffing is generous by comparison with industrial countries, where the student-staff ratio is more typically twice that in Africa. One reason is the propensity of African universities to offer a very wide range of programs and courses in each institution, resulting in wasteful duplication. Course enrollment of fifteen students is not unusual.

African universities also usually employ large numbers of nonacademic staff, especially to operate municipal and student welfare services and to care for the campus. An example from Ghana illustrates the general nature if not the exact quantitative dimensions of the problem. In a British university, reasonably analogous to Ghana's three universities together in size, age, and location (on the periphery of a large city), there are over six students for each member of the nonteaching staff and the ratio of

nonteaching to teaching staff is 1 to 6. However, nonteaching staff in the three universities of Ghana outnumber students and the ratio of nonteaching to teaching staff is 14 to 1. Most of the difference is in service areas. Guards, ground crew, and maintenance personnel totaled 902 in one of the Ghanaian universities and 166 in the British university. A second example is the University of Nigeria, which employs 52,000 staff for a student population of 77,000.

SUBSIDIES FOR STUDENTS. None of the twenty-four African countries for which recent data are available has a general policy of charging tuition fees that are not covered by a government subsidy in some form. The essentially universal policy of charging no fees for higher education means that the publicly borne unit costs are much higher than they would be if a significant part of the burden were borne by students and their families. But the no-fee policy contributes indirectly to high unit costs as well, since students and their parents have no incentive to contain costs. If instead of fee-free higher education, students and their parents had to shoulder a significant proportion of the total cost, pressure would surely develop to contain unessential expenditure and, in general, to increase efficiency.

In a similar vein, the long-standing practice of providing either free room and board on campus or an allowance to all students, thereby shifting to the public "educational" budget the considerable sums required to cover living expenses of students, greatly inflates publicly borne unit costs of higher education in Africa. Although several countries have begun to phase out support for the living costs of students, fellowships to students still constitute half the public expenditures on higher education in a number of African countries. The scope for reducing such public expenditure is particularly broad in many Francophone countries.

INEFFICIENT USE OF RESOURCES. Finally, unit costs are inflated by the failure to make maximum use of expensive teaching personnel and physical facilities, which is manifest in light teaching loads, in restricting class and laboratory hours to a specified portion of the day, and in letting the entire plant and staff lie idle at least twenty weeks a year. The scope for adding evening and vacation students to increase access to universities has almost nowhere been exploited, the University of Zambia being an important exception. With universities effectively closed to all but the fortunate few full-time students, there is a substantial population of students taking courses at their own expense overseas.

Inequitable and Inefficient Finance

Unlike the situation in some other parts of the world, tertiary education in Sub-Saharan Africa is overwhelmingly public in ownership and operational control. Private institutions of higher education are often explicitly proscribed in fundamental legislation and administrative regulation. Public ownership and control of higher education in Africa has meant for all practical purposes that tertiary education—including the living costs of its students, which are not properly an education expense—is entirely financed by the public budget. With few exceptions, students, their families, and their future employers are spared having to make any contribution to the costs of higher education beyond the general incidence of the tax system and the income forgone while studying. The extent to which the private rate of return to higher education exceeds the social rate of return is a useful index of public subsidization of education, since most of the difference between the two is due to including the state's contribution to costs in the social rate calculation and excluding them in the private rate calculation. The available evidence suggests that in Africa private rates of return to higher education are, conservatively, 150 percent greater than social rates, a multiple more than three times higher than in Latin America or in industrial countries generally and more than fifteen times higher than in Asia.

There are two undesirable consequences of this insulation of the beneficiaries of higher education from its heavy costs. Income inequalities are increased by the sharply regressive effect of higher education expenditures; the system ensures that the rich get richer and the poor get poorer. And perhaps more important, within the education sector as a whole and within higher education as a subsector, resources are allocated inefficiently.

A Program for Structural Adjustment of African Higher Education

If the preceding diagnosis of weaknesses in higher education in Sub-Saharan Africa were to be confirmed through careful analysis of the situation in individual countries, the four objectives to be sought for the short term through reformed policies would be clear enough: (a) improve quality, (b) increase efficiency, (c) constrain output, especially in those fields that do not directly support economic development, and (d) relieve the burden on public sources of financing by increasing the participation of beneficiaries and their families. But quality enhancement as

the first objective will cost money. Thus, implementation of policies to achieve the last three objectives will, essentially everywhere in Sub-Saharan Africa, be a prerequisite for freeing the resources needed to achieve the first. The four objectives would, of course, be pursued with differing mixes of policies appropriate to the circumstances of particular countries. The sequence of policy implementation would also depend upon the needs of each country; gradual phasing in of new policies, in stages over some years, would have to be the rule, not the exception.

Improved Quality

A quantum increase in the quality of tertiary teaching and research is the first objective. Long-term development goals cannot be met without it. Improvements in quality, however, are unavoidably expensive. So, given the requirements of other parts of the education system and the environment of constrained public resources, no advance here is possible without significant progress toward the other three objectives of resource conservation.

Better quality could be achieved through a variety of measures. Most immediately necessary are the establishment and gradual implementation of standards of provision for the full range of vital nonsalary inputs to teaching and research. Supplying libraries with multiple copies of basic textbooks, as well as supplementary books and periodicals, is the highest priority, closely followed by supplying laboratories and workshops with consumables and materials needed for equipment maintenance and repair. Resuscitation of long-term efforts to upgrade the academic qualifications of staff is also essential. Formal postgraduate training in masters and doctoral programs, for the time being mostly outside of Africa, is an essential part of this effort. But the need extends much further, to postdoctoral fellowships, faculty exchanges, collaborative research, and other professional links with foreign universities through which African academics are exposed to new developments in research and curriculum in their fields. Twinning arrangements, between a department in an African university and the same department in one or more foreign universities, are an especially attractive device for staff development at these sophisticated levels and can also profitably involve the service of foreign university staff in African institutions. For maximum productivity, such arrangements need to be sustained over many years.

Quality in tertiary education is also improved by rigorous testing programs administered independently of the universities and involving external examiners. Such testing is an essential ingredient in setting standards of performance to which individuals and institutions can respond. Independent performance measurement also creates an ambient in which efficient independent study programs can develop.

Finally, in the longer term, improvements in quality will be realized and sustained through the establishment of programs—and, in some cases, centers—of excellence for postgraduate education and research. These programs or centers could concentrate staff and resources into a critical mass. Participants at the Mbabane and Harare conferences on higher education have voiced their support for an appraisal of the advanced teaching and research capabilities and capacities of African universities, as a first step toward identifying potential sites for research and postgraduate teaching in priority areas. By establishing such specialized, high-quality programs and institutions, African governments would provide able African students with an attractive alternative to (more costly) foreign study, create incentives for university researchers to pursue their work on the continent, and in so doing address two aspects of the serious problem of "brain drain."

Increased Efficiency

Reduction in unit costs (per student-year of educational services provided) is the second challenge. This reduction would be achieved within existing institutions through measures such as the following.

- establishing and gradual phasing in higher numbers of pupils for each member of the academic staff
- setting minimum standards for class or course size
- reducing the ratio of nonacademic support staff to academic staff (perhaps in part by using student labor in some campus jobs)
- increasing the hours per week and weeks per year that academic staff and physical facilities are utilized
- expanding access for part-time, fee-paying students
- introducing self-study methods (for example, use of radio and correspondence) to teach low-enrollment courses
- gradually assigning to nonpublic sources the full cost for housing, food, and other welfare services provided to staff and students
- where feasible within countries—and prospectively even among countries—rationalizing programs and faculties and consolidating institutions, so that diseconomies of small scale are mitigated.

No country is likely to be able to implement all of these measures, but all can potentially reduce unit

- imposing national service obligations—for example, to teach school, work in distance education centers, or participate in adult literacy campaigns—before, during, and after enrollment in higher education
- promoting an educational credit market
- imposing a special tax on earnings of tertiary-level graduates during a transition to an effective system of graduated income tax.

Expansion of cost-sharing to include the beneficiaries of tertiary education and their families does not mean that governments should lessen their financial support to the subsector. Rather, promotion of broader financial participation should be seen as one way in which governments can help ensure the increase in financial flows necessary for the improvement and ultimate expansion of higher education.

Feasibility

The structural adjustment of higher education involves identifying the educationally and economically correct mix and then determining the optimal sequence and phasing of policy measures in the light of specific country circumstances. This task will not be easy either in its design or in its implementation. First, it will require analytical and planning capabilities that are nowhere plentiful, in some countries exceedingly scarce, and everywhere untested on a task of this complexity.

Second, political considerations will inevitably limit the feasibility of some desirable elements and sequences of measures, many of which will be perceived in the short term as threats to deeply ingrained interests of powerful groups in society (civil servants, professors, and students). Determined and very high-level leadership will be needed to overcome resistance.

Third, actual implementation will demand a level of managerial competence that is uncommon. The program will have to incorporate actions to support management, especially by developing capabilities to monitor and evaluate the impact of new policies and to adjust and fine-tune their implementation.

Fourth, very little can be expected to happen quickly, for institutional change of the magnitude required is always excruciatingly slow. Great persistence will be required.

Finally, and perhaps most important, a fundamental dilemma must be overcome. Rapidly applied, highly visible, and quick-yielding measures to reverse the precipitate decline and ensure the long-term improvement in the quality of African higher education are likely to be a necessary (although not sufficient) condition for acquiring social acceptance of the painful measures that will have to be taken to achieve the three objectives for conserving resources. But it is only after those conservation objectives have been achieved that resources will be available for the sustained maintenance and improvement of quality. Bilateral and multilateral agencies could address ways to resolve this dilemma of transition as a first step in the restructuring of international collaboration on higher education in Africa.

Academics, university administrators, public sector managers, and students share an acute recognition of the intolerable situation of African higher education. In most countries measures to increase efficiency, constrain output, and diversify finance are already under consideration, and in some places they are beginning to be implemented. As such measures take hold, the possibilities for introducing urgently needed improvements in the quality of higher education will grow. Recommendation 4 summarizes the approach.

Recommendation 4

Recent deterioration threatens the ability of most of Africa's institutions of higher education to contribute to the region's development. The quality of these institutions must first be restored and then improved, so that the region can extract maximum advantage, for its own purposes, from the accelerating worldwide advance of science and technology. In most countries, however, a period of adjustment to changed economic circumstances is a short-term prerequisite for improving higher education. Some tertiary institutions, individual campuses, academic departments, and teaching programs need to be amalgamated into larger units of economically viable size. Personnel reductions, especially of nonteaching staff, are indicated in some countries but should be sought in such a way as to increase the average level of relevant training and experience of those who remain, particularly those in academic positions. The number of students at most institutions needs to be stabilized, by tightening admission and performance standards and by eliminating living allowances and free room and board; the inequitable effect of this final measure can be mitigated by the provision of scholarships based on need. Such consolidation in higher education will help to reestablish an economically and pedagogically viable base from which to expand the number of graduates and the scope of research and community service.

SADCUA file

2.9.92

Polly
Dr Davies

Tertiary level: Polly considers funding emphasis still at 'academic' UB.

Started trade training, then technician, then 1990 degrees via UB. Offer post + 1 yr BSc. = ± A level.
20/300 graduates or heads 100/700.

Presently 700 full time resident: few live outside.

Finance short, applicants = 2× places presently.

Running costs: good for tech equip.
adequate @ staff etc (Min of Ed) but much less than UB.
O- research
O- staff development, conferences etc.
Inefficiency in staff accom costs on arrival: Lack of housing pool.

Oil to photograph.

Out of step with NDP7: 1700 by 1997! No space. Long term plans absent, prefer institutions.

Malawi: University had difficulties getting bldgs: donors would fund contents, but not bldgs. Single institution for tertiary inc vocational. 80-90% vocation predecided: no anti-technical bias because selectn/pay rates =.

educationists in practice, but be careful to avoid too-specifics; student needs undefined; national prestige: housekeeps: cleaners + maintenance factors. Architects need to have a standard of comparison, whether from experience ~~of~~ or from study or expert advice.

Character / quality of environment needs to be reflected in the brief.

Client + architect must cooperate at macro plan level ~~at~~ while particular expertise is needed — ~~at~~ particular facilities.

Design of construction

Considerable local input needed: need for technical/architectural advisors to the brief drafters / scheme assessors. (can also facilitate competitions): desirable to keep an objective view of needs / solutions. Design: local climate + culture need reflecting

Local technology / available materials

Sustainable (maintainable), facilities + equipment: Standards, overall standards of living / economy / education.

Reduction of unnecessary standards in equipment.

Maintenance progs \ policies

Funding required: cost of replacements: high cost through unskilled users ~~spec~~ causing excessive wear + tear. Often not suitable staff obtained / kept: Standards of staff performance, materials / eq performance.

SADZ/1A/10

UIACHE : UB. 1.9.92

Permission ok: none will be given.
Funding from govt relates to NDP plans.
NDP 6 lifted target to 5000.
Now + current masterplan: target 10 000 still within time frame 2000.
Loose links between academic + physical planning.
Using UGC standards for space; not close curriculum consideration. Money hasn't been a constraint, as errors can be corrected in next phase.
Last plan review was substantially from outside. 6year review periods.
→ 1992 3400 (a little behind schedule of NDP).
350K prim 105K 2ndary 1997
Current plan period P130 mill with escalations (max ± 160-170 million)
SAPSE to build control.
Appropriateness is not a priority: the pace exceeds the possibility of proper review / briefing / assessment.
Perceptions: want big = library: ready to demolish finishes not plastered etc.
Accountability of academic staff for requirement specification.
Target 80% res, plan allows 40%; Forms of housing too uniform.
Scale of facility: ie single dining hall for campus.

SADCUA
file

IN SEARCH OF THE APPROPRIATE
A view from Southern Africa.

- It seems less easy to make higher ed facilities appropriate
- Target audience:]

Setting priorities in eductn (as it affects tertiary)
— National development plans — institutions own development plans. (parastatal/private)
perceptions of the institution as prestige/status symbol.

Allocatn of resources: capital vs running costs:
Expatriate costs for ~~same~~ running costs: absolute need vs need for cross-fertilizatn of ideas.
Financial ministries not experts on required allocations.

Specific requirements (defining of), (broadly only): budget; student numbers; courses; staging of growth. Is the campus a collection of buildings having activities, or whether a community is shaped. Residential policy.

Objectives: multi-use & part of community to max rather than warp town. Avoid exclusivity: balance against security/riot/disturbance: damage to facilities - deliberate: less separatn of student body from/off-campus population in general.